AUGUST 1954

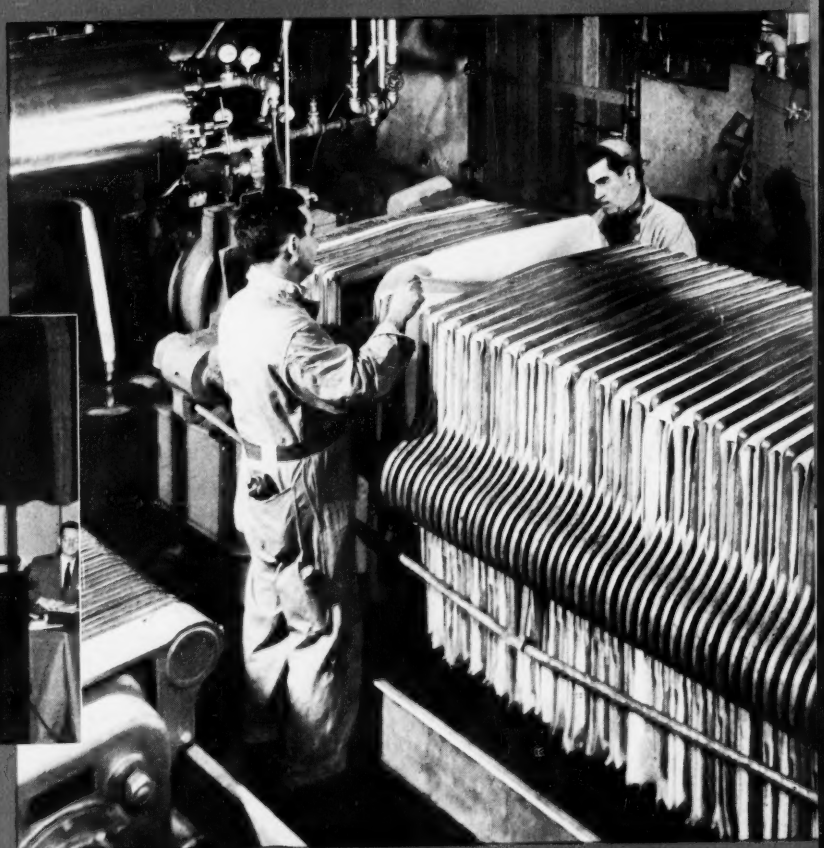
35 CENTS

FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

TRANSPORTATION New "piggy-back" train-trailer saves in food shipment. p. 77

ENGINEERING Significance of food engineering analyzed at IFT symposium p. 80



PROCESSING In new streamlined winery, high efficiency is attained by advances in filtering and other operations. p. 74

PERSONNEL Training men to fight fire is part of effective safety program. p. 70

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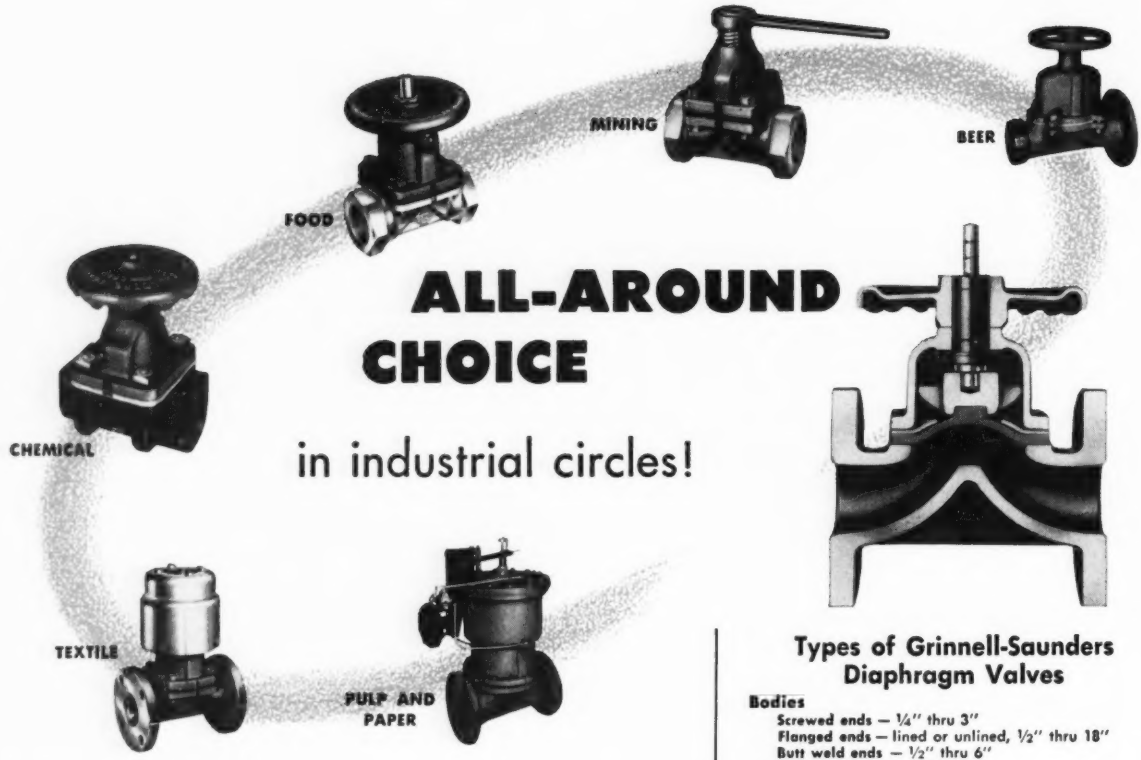

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in industrial circles!

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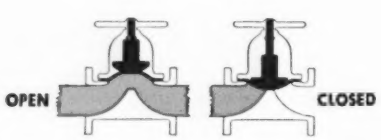
In industrial plants all around, Grinnell-Saunders Diaphragm Valves are preferred. *Why?* Because they have proved themselves economical and efficient in handling materials as diversified as corrosive fluids, gases, beverages, foods, compressed air, suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors.

Grinnell-Saunders Diaphragm Valves are available in a range of bodies, linings and diaphragm materials . . . and in a variety of styles and operating mechanisms. If you have a valve problem, it certainly will be well worth your while to consult a Grinnell engineer.



Types of Grinnell-Saunders Diaphragm Valves

Bodies
- Screwed ends — ¼" thru 3"
- Flanged ends — lined or unlined, ½" thru 18"
- Butt weld ends — ½" thru 6"
- Socket ends — ½" thru 4"

Angle Bodies
- Screwed ends — ¼", ⅜", ½", ¾", 1¼", 2"
- Flanged ends — ¾" thru 6".

Bonnets
- Handwheel operated bonnet (available with rising stem, travel stops, extended stem, chainwheel, adapted for Tejax indicator)
- Quick turn — lever operated bonnet, ½" thru 3"
- Bendix-Westinghouse topworks
  - standard (air to close — spring to open)
    - Robotair, ¼" thru 1"
    - Rotochamber, 1" thru 4"; in tandem, 5", 6"
  - direct acting (spring to close — air to open)
    - Robotair, ¼" thru 1"
    - Rotochamber, 1" thru 4"
  - double acting (air to close — air to open)
    - Robotair, ¼" thru 1"
    - Rotochamber, 1" thru 4"
- Piston operated, 6" thru 12"
- Sliding stem bonnet, ½" thru 12"

Diaphragms
- Natural rubber, neoprene, reinforced neoprene for vacuum, hycar, butyl, white gum rubber, Kel-F, Teflon, polyethylene.

Body Materials
- Iron, bronze, stainless steel, cast steel, aluminum, monel, saran, durimet

Body Linings
- Glass, lead, soft rubber, hard rubber, neoprene, saran

Bronze Beer Valves
- Socket both ends
- Socket end to flange end
- Flange both ends
- Socket end to male hose thread end
- Flange end to male hose thread end
- Male hose thread both ends

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pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

August 1954

Volume 26 Number 8

FOOD ENGINEERING

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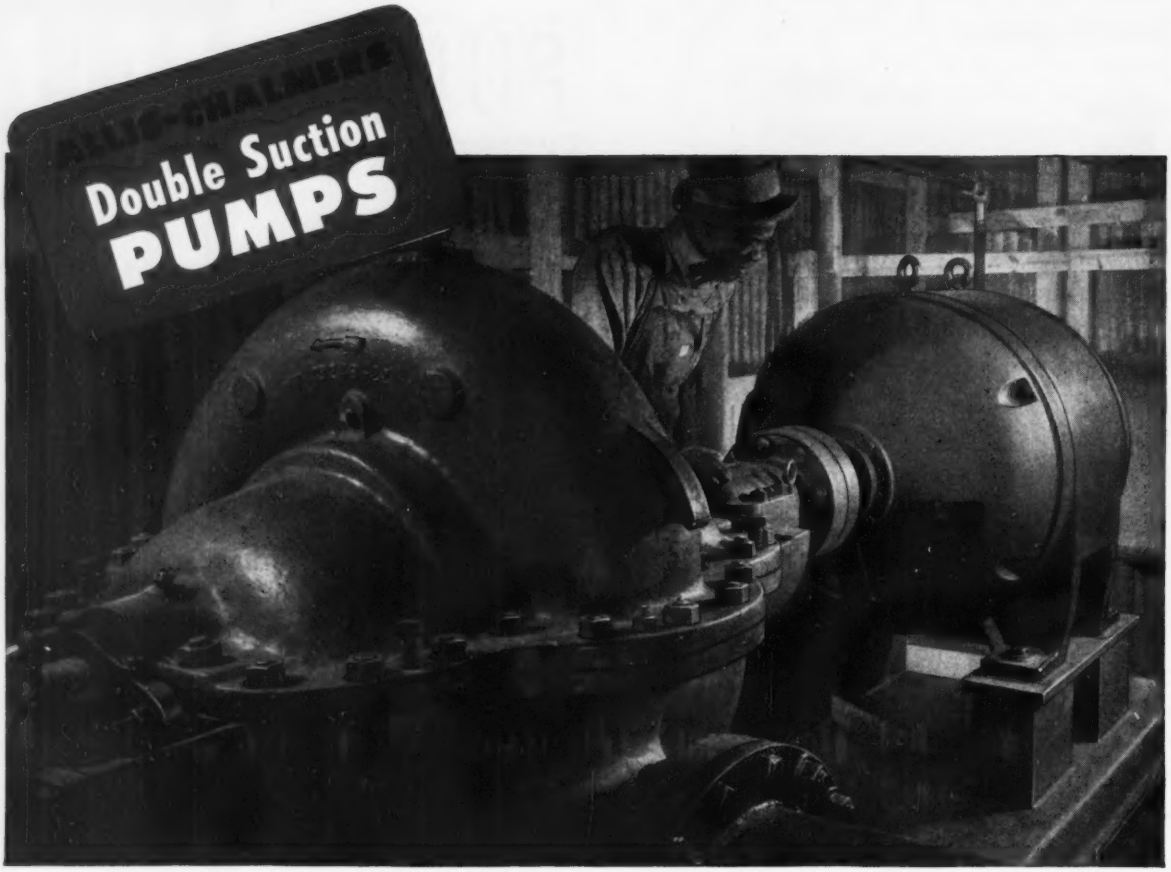

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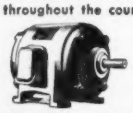

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

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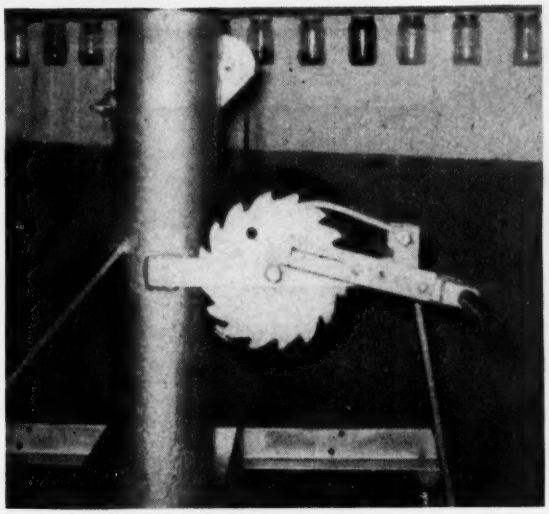
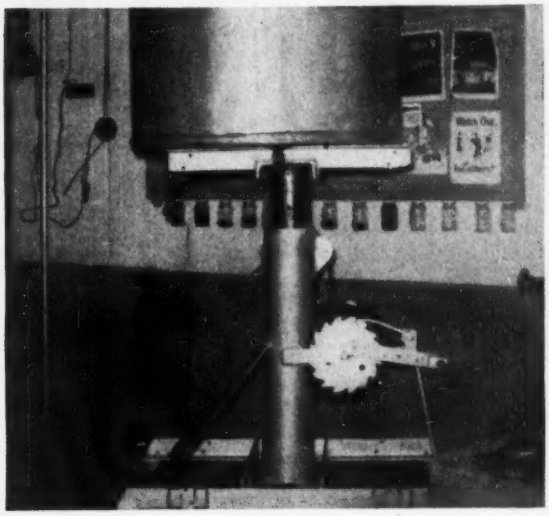
PRACTICAL IDEAS





Unique Hoist Application

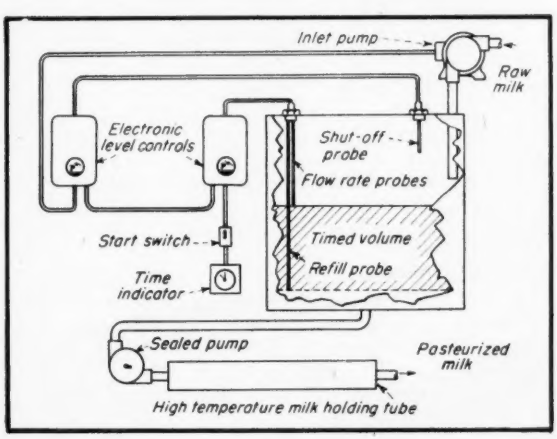
Because of low ceilings in our plant and an unavoidable congestion of our holding tanks, along with low cooking kettles in our gravity flow operation, a flexible system had to be devised—one which permitted free movement, in any direction, of a bulky container.

It was necessary to find a means of raising and lowering our tall circular, 100 gal. capacity, water-jacketed cooling tank and also provide means for making the tank mobile. To accomplish the latter it was necessary to lower the tank, since in its elevated position it is flanked on both sides by two flat holding tanks which are permanently suspended from the ceiling.

All of this was accomplished by installing an air piston (formerly an automobile lubrication hoist) controlled by a cable attached to a crank and a simple ratchet (see left photo) to prevent slipping. The 800 lb. tank, plus the 1,110 lbs. of product in it when full are handled easily by one operator.

The tank is mounted on a platform which is welded to the piston and the whole assembly is welded to a stand with free-wheeling casters (see right photo) attached.

Since the tank is in use less than a fourth of the time it is a definite advantage to have it mounted on casters so that it may be rolled away to an uncongested portion of the plant.—*Daniel Issenberg, Lincoln Foods, Inc., Lawrence, Mass.*



Pasteurizer Control

A simple, reliable, accurate and sanitary control system can be installed to measure flow rate through a high-temperature short-time pasteurizer without stopping the pasteurization or affecting the taste of the milk.

To meet all these requirements the regulating system includes electronic liquid level controls in conjunction with a time indicator.

Double sanitary probe rods (see sketch) are suspended in the milk surge tank. As the milk level drops and exposes the upper flow rate probe rod (located below the point of turbulence), the control starts the time indicator. The milk level continues to drop until the low level probe rod is uncovered, stopping the time indicator.

The milk volume between the upper flow rate probe rod and the low level probe rod is a known constant. The elapsed time for discharge is indicated on the face of

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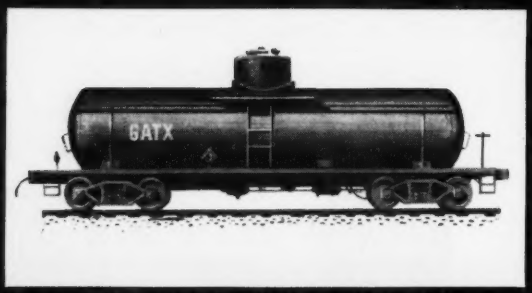
"surgery" service for GATX tank cars



For minor or major repairs, GATX tank cars have their own "hospitals." More than 30 General American car repair shops are located throughout the country, so that no car is ever more than a few hours away from professional tank car maintenance. These shops have experts to service the 200-plus different types of GATX tank cars. They have the necessary tools, jigs and fixtures; the testing equipment; and parts inventories. All work can be done under A.A.R. and I.C.C. specifications.

When it comes to keeping the 47,000 cars in the GATX tank car fleet rolling, General American's car repair shops work with the engineering and traffic departments to give shippers more dependable service for transporting liquids in bulk.

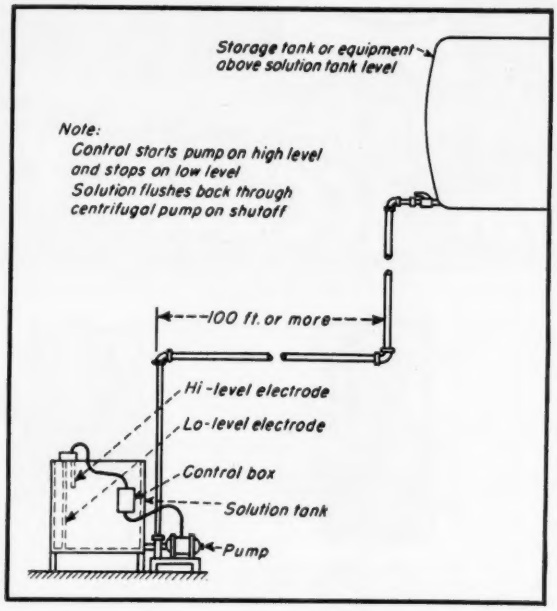
GATX GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street, Chicago 90, Illinois
Car repair shops throughout the U. S. A. Offices in principal cities

a time indicator. Thus the flow rate is easy to calculate in gallons per minute.

Since all of the milk leaving the tank passes through the pasteurizer holding tube, the calculator flow rate tells accurately whether the milk that passes through the holding tube is within the taste and legal limits of the pasteurization process.

An additional level control and a probe rod located near the top of the surge tank can be connected with the low level probe rod to operate the inlet pump that fills the tank.—*Photoswitch, Inc., Cambridge, Mass.*


Storage tank or equipment above solution tank level
Note:
Control starts pump on high level and stops on low level
Solution flushes back through centrifugal pump on shutoff
100 ft. or more
Hi-level electrode
Lo-level electrode
Control box
Solution tank
Pump

Automatic Pipe Cleaning System

Shift to sanitary pipe lines of the clean-in-place type in dairy or other food plants can result in considerable saving in time and labor. Nevertheless, before their use is entirely satisfactory, drawbacks encountered may have to be circumvented.

A major hurdle is the cost and labor of installation of extra, otherwise unnecessary sanitary lines to provide a closed circuit for return of cleaning solution to charging tank.

Problem is small in a short hook-up, but it becomes expensive to install a return system from a distance of 100 ft or more back to the tank.

Here's how to side-step the return circuit installation:

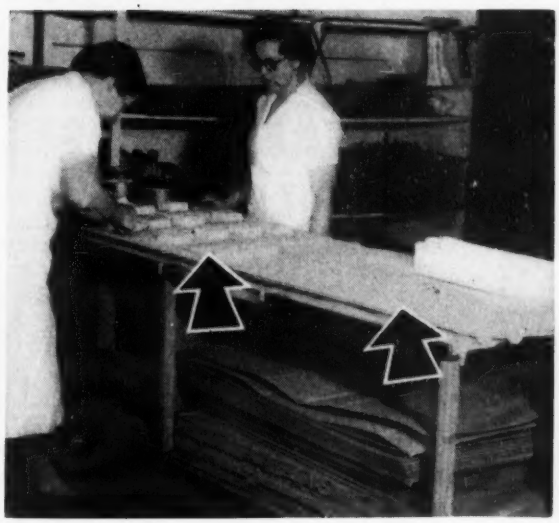
Locate solution tank and pump (of proper size for solution velocity to clean line) at lowest point in the long system of tubing.

Then attach to the other end of your line a length of sanitary hose, which in turn is attached to some tank or vat not at the time in use.

Solution tank must be equipped with high-low, level-control. Now, when line is to be cleaned, pump will lower solution until low-level control is reached, thereby stopping pump. Then, solution flows back through idle centrifugal pump into tank until high-level control is reached to again start pump.

Cycle repeats automatically until line is clean.

From time of starting pump, operation is automatic and cost of level controls should be between $65 and $75.—*John J. Buhr, Engineer, Creamery Package Mfg. Co., St. Louis.*



Novel Use for Hold-Over Plates

With a high degree of success we appropriated to our own type use, the type plates normally employed to maintain refrigerating temperatures in insulated trucks.

These plates contain tubing and a eutectic solution. Usually they are charged by circulating ammonia, Freon or methylchloride through the tubing at night to freeze the solution in order to hold temperatures in the delivery trucks throughout the day.

We use these plates (see arrows in photo) in working on our company's specialty—decorated ice cream.

The solution in the units is frozen by putting the plates in the hardening room. The plates then are used as slabs on which to cut, decorate and wrap individual slices of ice cream without permitting the ice cream to become soft.

Previously, dry ice was employed as a means of temperature control. However, it was found to be too expensive.

Except for the initial cost, there is no expense involved in the use of hold-over plates. One plate is effective for a half day so two plates are used during each day's operation.

Incidentally, we have found stencilled slices more attractive than center-filled bricks of ice cream, because the design is sharper through better control.—*Sullivan Milk Products Co., Battle Creek, Mich.*

Five Rules To Prevent Major Fires

If five fundamental rules had been followed, every disastrous conflagration in the industrial history of the United States could have been avoided, according to W. K. Ousley, vice-president of the Boston Manufacturers' Mutual Fire Insurance Co.

Speaking at the Society of Automotive Engineers' Annual Convention in Detroit, Mr. Ousley listed these rules:

1. Use safe construction. This means that fire-resistant material should be used, and that fire area is limited to 100,000 sq. ft.
2. Install a complete automatic sprinkler system.
3. Provide ample water supply.
4. Organize, educate and drill employees in fire-prevention and protection. This training should include building evacuation and fire fighting.
5. Induce management to take an active part in making the entire organization fire-safety-conscious.

Any plant engineer can apply these rules to his own

Choose from fmc's FAMOUS FAMILY OF M & S FILLERS

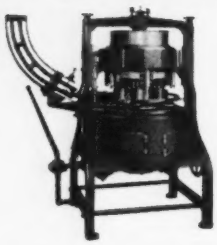
The Standard for Progressive Canners because they are UNSURPASSED for ACCURACY

FMC M&S Plunger Fillers have set new standards for high accuracy filling. On the basis of thousands of accuracy of fill tests, by weight testing methods, M&S Fillers are *unsurpassed for accuracy!*

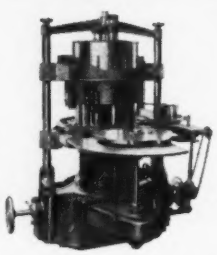
And M&S Fillers lead the field for *versatility,* too: no other fillers can handle as wide a range of liquid, semi-liquid and heavy semi-solid products.

These fillers are engineered for heavy duty and long life. Operating parts are fully enclosed. Drive gears run in oil. All inspection, lubrication, and adjustment points are readily accessible. Non-corrosive metals are used on all contact surfaces. Special "No-Can, No-Fill" feature prevents product waste.

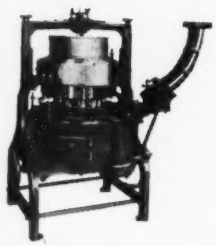
By all comparisons, these are the finest fillers made — designed and built to perform better at lower cost.



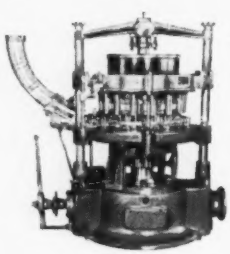
FMC M & S 6 Pocket Fillers
Handles virtually any liquid, semi-liquid or semi-solid product. Can be furnished for can sizes from 202x102 to 610x910 Speed: 150 CPM in small containers.



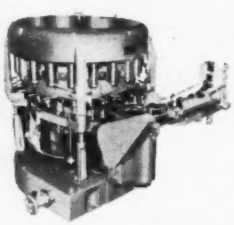
FMC M & S 9 Pocket Fillers
For filling pulps, pastes and liquids in containers from 202 x 203 to 404 x 611 size. Speed: up to 150 CPM on light liquids; 250 CPM on heavier products



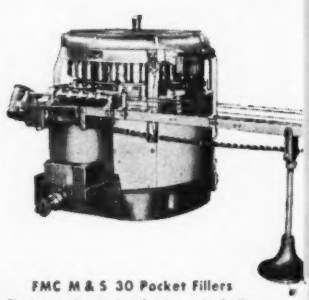
FMC M & S 10 Pocket Fillers
Handles a host of products of varying consistencies from condensed milk to heavy dog food for containers ranging in size from 202 x 102 to 404 x 604. Speeds up to 300 CPM.



FMC M & S 15 Pocket Fillers
For container sizes up to 211 x 400. Handles citrus concentrates, baby foods and other semi-liquid free flowing products at up to 450 CPM.



FMC M & S 20 Pocket Fillers
Delivers up to 500 CPM using jars or cans. Typical products filled are lubricating oil, apple sauce, and chocolate syrup Handles containers within a range of 202 to 401 diameter.



FMC M & S 30 Pocket Fillers
Designed for baby foods and similar products Handles 5 to 8 ounce jars or cans at speeds of 600 CPM.

There's an M & S Filler for virtually every product, can size, and can line speed

Write for full information, or call your nearest FMC representative.

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

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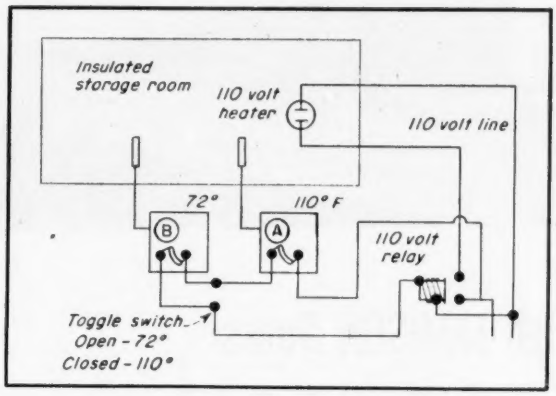
WESTERN: SAN JOSE, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

operations, and thus practically guarantee that fires of catastrophic proportions will not occur.—*"Management Review", American Management Association, New York City.*



One Switch—Two Temperatures

When two different fixed temperatures are desired in a room or on a piece of equipment, a simple control arrangement can assure temperature maintenance merely by the throw of a single switch.

As an example, assume two dairy products are to be incubated in the same room, one of them at 72 deg. F. and the other at 110 deg. F. Installed are two controllers and a single-pole, single-throw toggle switch. Mercury switch type temperature controllers are wired in series (see sketch) with each other to energize the load relay when their contacts are made. One controller is set for 72F. and the other is set for 110F. Bulbs for both project into the insulated room.

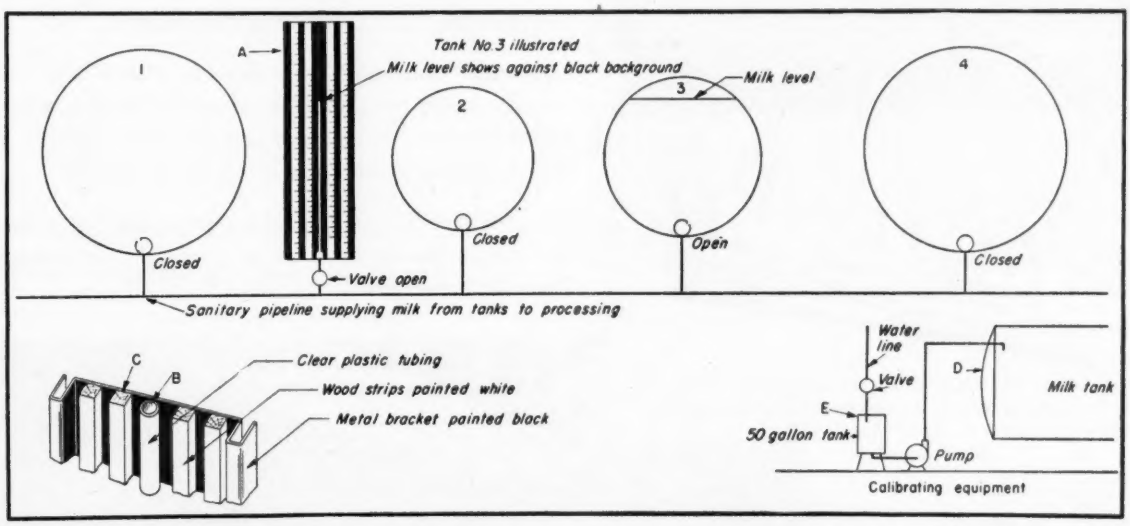
When the toggle switch is closed the storage room is automatically controlled at 110F. since the circuit is made from a line through the mercury switch of controller, set for 110F. through the toggle switch and up to the coil of the load relay. As temperature varies at the controller bulb, the mercury switch makes and breaks the circuit to energize the relay. The relay, in turn, operates the heater and fan, turning them on and off as needed to maintain 110F. in the room.

Conversely, with the toggle switch open, the storage room is maintained at 72F. in a rather unusual fashion. The circuit is made from the line, through temperature controller A (which, being set at 110F., has its mercury switch contacts constantly closed at temperatures below 110F), through temperature controller B, and thence to the coil of the relay. Now the controller job is being handled by temperature controller B, which makes or breaks the circuit as required by the temperature at its bulb.

A sign on the switch indicates the switch position that permits either temperature to be maintained automatically at the option of the operator. The arrangement is easy to use and requires a minimum of adjustment, as has been demonstrated by plant experience.

To simplify the operation for operating personnel, the switch can be marked for the product to be processed, thus eliminating possibility of error.

Control setup can be applied to a vessel for processing two products at different times and different temperatures with the controllers and relays connected to a two-position motorized valve, or to a solenoid valve in the hot water or stream line.—*"Industrial Control News," Minneapolis Honeywell Regulator Co., Philadelphia.*



Easy Way to Measure Tank Contents

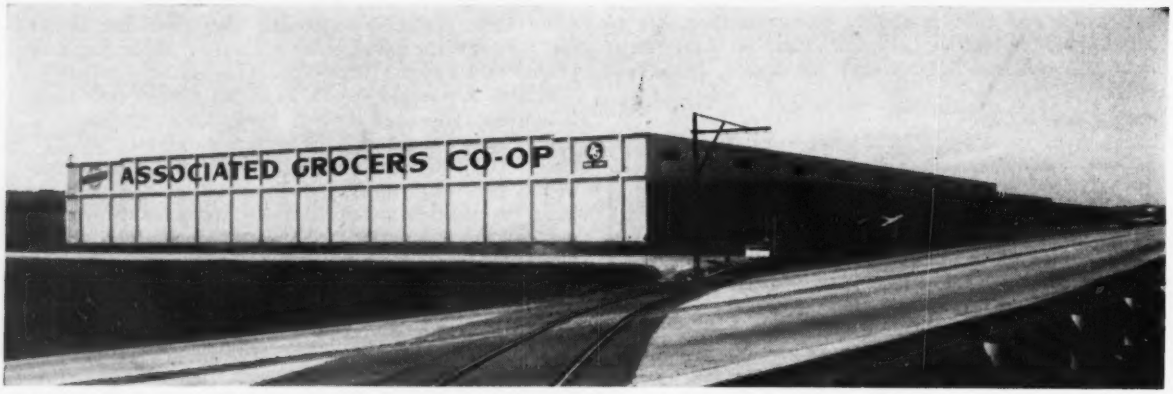
A quick and easy method of determining the amount of milk or other liquid in storage tanks has been put to use at the Atlanta plant of Southern Dairies.

Though calibration devices are not new on the market, the one that was made and installed by our Atlanta Engineering Dept. has distinct advantages.

Our particular device was installed in our plant at an expense of about $30. As set up, it is capable of handling any number of tanks.

Among the many uses to which it is put are recording of inventories, getting information for standardizing products, and determining the amount of ingredients such as vitamins which are to be added to tanks of the milk which is in process.

The calibration device is a metal bracket—(A) in sketch—about 9 ft. high and 18 in. wide. It is fastened to the wall near the storage tank. A clear plastic tube (B) is secured on the center of the bracket in a way that will allow it to be removed for cleaning, and is connected to the discharge pipe line from the tank or tanks. An



Containing 330,000 sq. ft. of storage space, this warehouse of the Associated Grocers Co-Op in Seattle is the largest of its kind in the Pacific Northwest.

High JAMISON Doors Fit into Novel Time-Saving Method of Handling Bananas

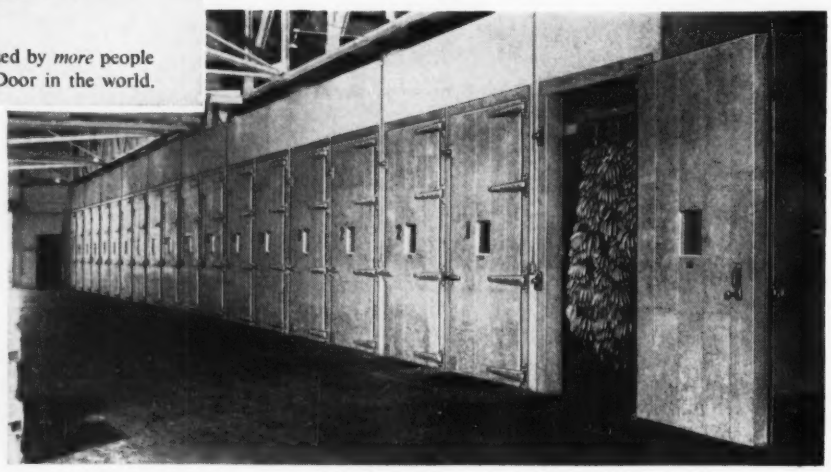
It takes only one trip and a minimum of time to move numerous bunches of bananas to the ripening rooms in this Associated Grocers warehouse. Bananas suspended from a cross-bar are carried by fork lift truck to one of the 20 doors. Here, Jamison Standard Doors provide such ample head room that the truck can easily pass through and place the cross-bar on supporting beams.

Completely metal-clad, the Jamison Doors offer the strength needed to withstand hard usage. Two Wedgetight Fasteners assure a tight seal and are interconnected to release simultaneously at a touch of the handle.

For additional information about cold storage doors, consult your architect or write to Jamison Cold Storage Door Co., Hagerstown, Maryland, U. S. A.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.



Architect—
Robert Ross
Consulting Engineer—
Richard Stern
General Contractor—
Morrison Knudsen
Insulation Contractor—
Northwest Cork and Asbestos
Seattle, Washington

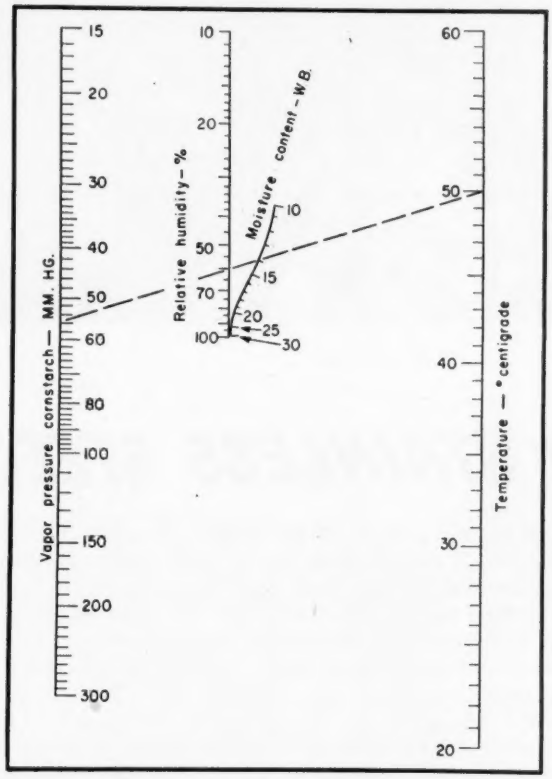
Bananas move quickly in and out of ripening rooms through this battery of 20 Jamison Metal-Clad Standard Doors. Stored bananas can be inspected through peep-holes without opening doors.

For more information, use coupon on page 187.

enameled wood stick (C) marked off in gallons is fastened to the bracket for each tank.

In calibrating or regulating the gage so that the amounts indicated on it actually represent the correct contents of the tank, great care must be taken. Water is pumped into the tank (D) in 50-gal increments, from tank (E). As it rises in the plastic tube the mark for each 50 gal. level is carefully inscribed.

Once calibrated properly with water, the gage will be correct as long as the tank is not moved. The amount of milk or liquid in the tank can be checked thereafter by one quick glance at the gage.—*Mehl Renner, Chief Engineer, Southern Dairies, Atlanta, Ga.*



Water Sorption of Corn Starch

In food processing, packaging and storage of corn starch or materials containing corn starch, the equilibrium moisture content and vapor pressure of the starch at various temperatures and relative humidities are important.

The accompanying nomograph facilitates a quick check of the hygroscopic moisture equilibrium of corn starch over a temperature range of 20-60° C. In addition, the chart yields the vapor pressure of corn starch over the range 40-60° C.

Previous studies have shown that the moisture-sorption properties of one unmodified corn starch can generally be applied to other normally prepared unmodified starches.

Here's how to determine the equilibrium moisture content and vapor pressure of a corn starch stored in an atmosphere of 60% relative humidity at 50° C.

Connect with a straight edge, on nomograph (see sketch), 50 on the temperature scale with 60 on the relative humidity scale. This cuts moisture content scale at 14 and the vapor pressure scale at 56. Therefore, the moisture content (wet basis) is 14 per cent and the vapor pressure is 56 mm. Hg.—*Joachim Echevarria, New Orleans.*

Keeps Employees Neat

Food companies which provide uniforms for their employees like their workers to look neat at all times. This is particularly true when these workers are salesmen-drivers for their delivery trucks.

To help and to encourage its drivers to maintain a "spruced up" appearance, Pepsi-Cola Bottling Co., Cincinnati, has installed a full-length mirror in the wall alongside the door through which the salesmen-drivers leave the sales office at the plant. At a quick glance on the way out, the drivers can spot any irregularities in their uniforms. —*FE Staff.*

Bumper Sign Builds Safety

Slogans on front of truck (see arrow) stimulate interest of Pabst Brewing Company drivers in the company's active safety campaign. Also made conscious of safety precautions are drivers of other vehicles and pedestrians who at other times may be drivers.—*FE Staff.*

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Send one of your ideas to FOOD ENGINEERING.

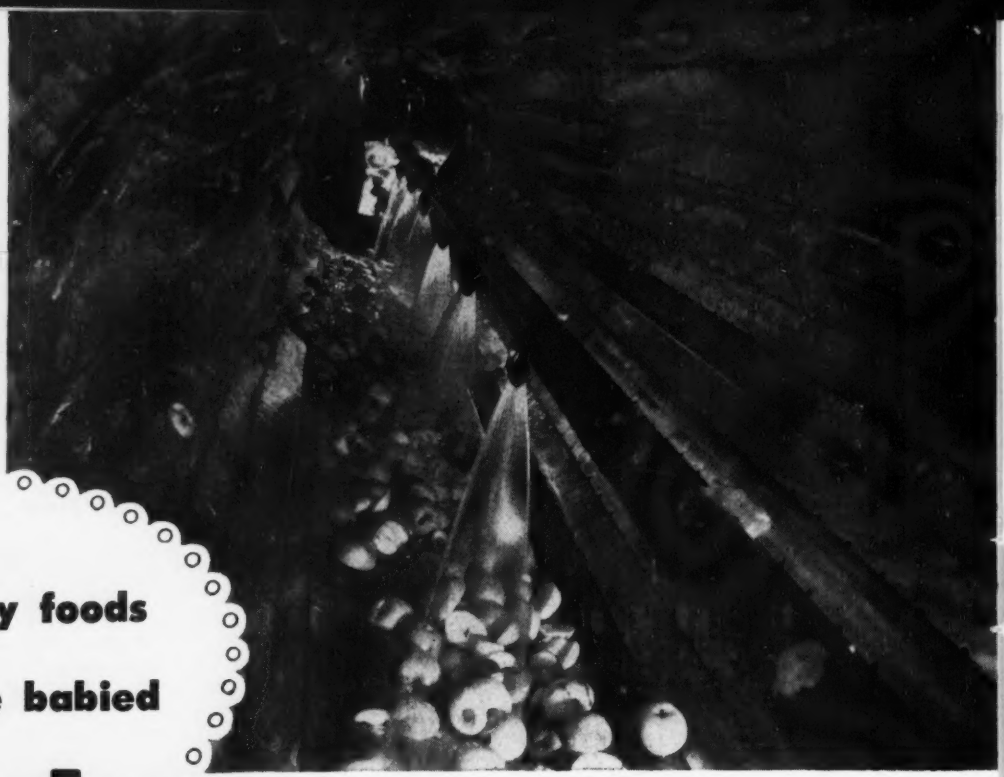
Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

Also, $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you. Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors

JUNE PRACTICAL IDEA WINNER was "Three-Flavor Ice Cream Package," submitted by C. C. Davis, Lexington, Ky.



LOOK INTO THE GLEAMING, clean interior of a Stainless Steel rotary washer. Apples are tumbled under a stream of water at an early stage in preparation. The washer was fabricated by Leitelt Iron Works, Grand Rapids, Mich.

when baby foods have to be babied

Gerber

FINDS YOU CAN'T BEAT STAINLESS STEEL

THIS STAINLESS STEEL VOTATOR is used for rapid sterilization and cooking of such acid products as apples, peaches and pears. This continuous closed heat transfer process equipment was manufactured by Votator Division of the Girdler Corporation, Louisville, Ky.

"BABIES are the most important people" to Gerber Products Company, Fremont, Mich. That's why protection of quality and purity comes in for such close attention in processing Gerber's Baby Foods. And that's why Stainless Steel holds down so many vital spots in the production line.

As food in process passes through the receiving, preparation, kitchen, cooking and canning departments, about the only thing it touches is Stainless Steel. That's because Stainless Steel has such superior corrosion resistance . . . because it is unaffected by food acids and prevents contamination of the product . . . and because its ease of cleaning makes "housekeeping" so much easier.

Stainless Steel equipment at Gerber's includes steam peelers, rotary washers, trim bins, work stations at the picking belts, screw steamers, hammer mills, finishers, holding tanks and filling machines.

If your operations call for equipment that is easy to clean and easy to keep clean . . . equipment that resists corrosion . . . equipment that lasts and lasts, Stainless Steel is the logical choice. But be sure it is perfected, service-tested USS Stainless Steel, made to give you the finest performance.

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COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
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USS STAINLESS STEEL

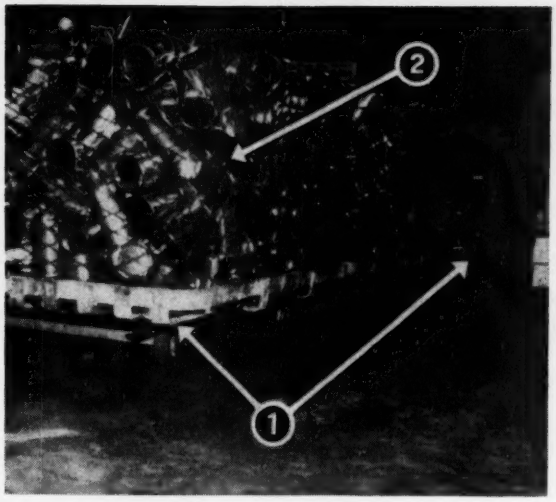
4-1620

SHEETS · STRIP · PLATES
BARS · BILLETS

USS

PIPE · TUBES · WIRE
SPECIAL SECTIONS

UNITED STATES STEEL



Knock-Down Retort Gondolas

Flat retort trays—(1) in photo—3 in. high and approximately 38 by 38 in., designed to hold seven cases (24S) vertically stacked cans (300 x 407), may be converted into modified gondolas capable of holding 23 cases jumble packed.

Flexibility of operation is the gain.

This is accomplished by setting inside the retort trays four sheets, 20 x 36 in., standard expanded metal (2), 1½ No. 9, joined at corners by three welded rings. Each "set" can be easily folded and piled to occupy much less space than would be required by the corresponding capacity of upright retort cars.

The urgency for developing the portable side sets was brought about by the need for retorting jumble pack rather than vertical pack for which the equipment was intended.

Three 10-car horizontal retorts were available with a filling, closing and retorting line producing 125 cases per hr.

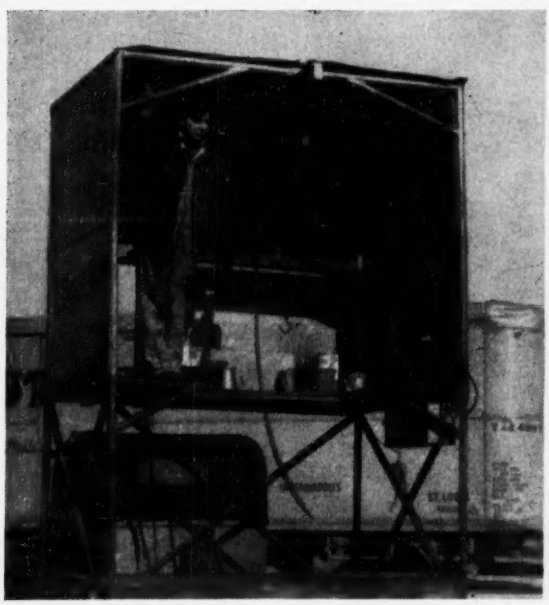
It was found that slightly fewer cans can be jumble packed into a retort tray than occupy the tray when placed vertically.

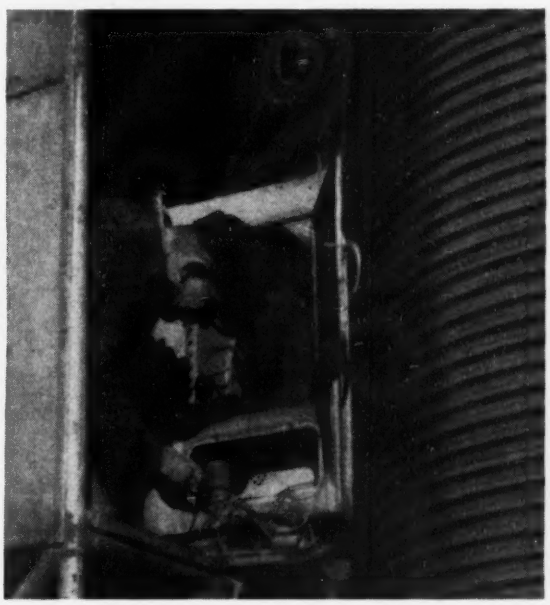
Converting a retort car (dolly) and a single retort tray into the equipment as pictured may be achieved at about one-tenth the cost of rigid gondolas. In our cannery storage space saved is more important than the cost of equipment.

Standard expanded metal is just as good and cheaper than flat expanded metal for this purpose. Cut edges may be burned to a smooth edge and careful layout on large sheets will provide at least one side smooth on every section. Special orders for 20 in. wide stock may be obtained from the manufacturer.

The 20 in. height is judged optimum for strength of sides and ease of unloading. At present, hand casing is done. However, the use of a lift truck or sling with a hoist to elevate the whole load to an unscrambling table is feasible.

It is found best to galvanize sets of expanded metal because a rusty filament repeatedly formed on the exposed material during retorting cannot be eliminated by water, ammonia or detergent scrubs.—*W. A. Hastings, Production Manager, Marine Foods Packing Co., Seattle, Wash.*





Portable Elevated Work Shop

Servicing of motor and compressor on refrigerated trailers can be simplified and expedited through the use of a truck-mounted mobile elevated work shop.

Three sides of the shop (see left photo) are enclosed to provide protection for workers during cold or inclement weather.

Work shop is elevated just high enough so that when the truck transporting it is backed up to the trailer, the floor of the shop is below the motor and compressor of the trailer at a convenient height for dismantling or repairing.

Work shop is constructed on a frame made of welded pipe. This construction provides sufficient strength so that a hoist (see right photo) can be attached to the roof beam for installing or removing the refrigeration assembly or parts of it.—*FE Staff.*

FROM COAST-TO-COAST . . . IF IT'S PAPERBOARD, CARTONS,
CARRIERS OR SHIPPING CONTAINERS . . . IT'S A JOB FOR . . . . .

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Check the quality features of the highly successful DOTTIE'S QUICKIE COOKIES cartons pictured here. Foil lined, these scientifically accurate ACM-GAIR packages are greaseproof, stop frostburn, lock *out* moisture, lock *in* all the original kitchen freshness and flavor! These cartons, together with special machines, installed by us within six weeks, *increased production 300%!.. cut labor costs in HALF!*

If you have a packaging problem, by all means use our free consulting service. Put it up to our capable engineers. Send for our Packaging Problem Data Sheet or write us now about your needs.

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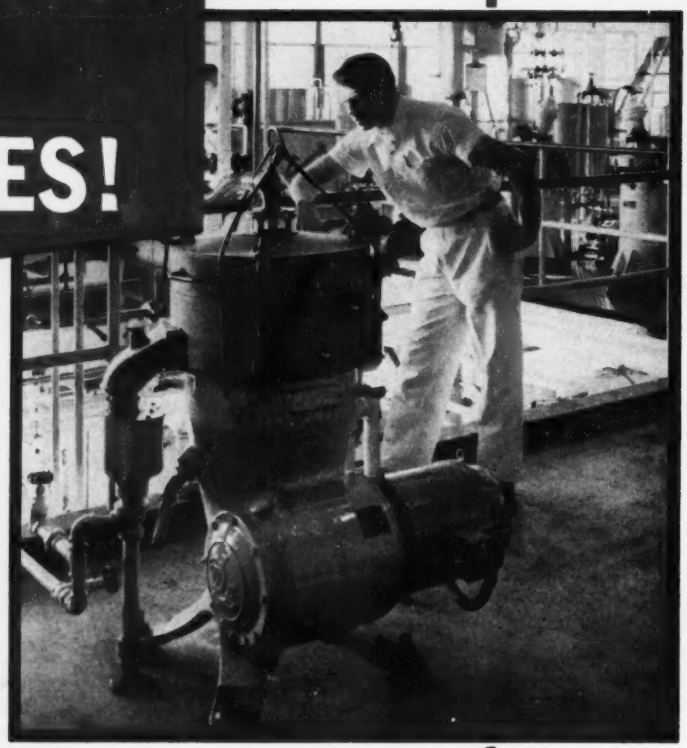

In many of America's most progressive chemical, pharmaceutical and food processing plants De Laval Separators and Clarifiers have proved to be a sound investment. So sound, in fact, that the centrifugals pay for themselves.

De Laval Centrifugals introduce the economy of *continuous* separation into processes formerly slowed down by batch separation with filters or settling tanks. In many cases they not only cut costs, but also improve the product.

If *your* processing involves liquid-liquid, liquid-solid or liquid-solid-liquid separation, investigate doing the job the *De Laval* way.

De Laval Engineers will be glad to put their wealth of experience at your service. They have shown many other manufacturers how to save money. Let them do the same for *you*.

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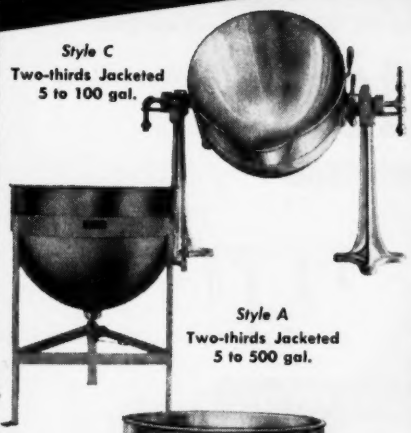
DE LAVAL

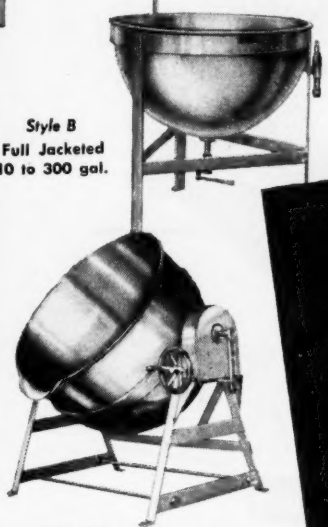
FOR FASTER PROCESSING SYSTEMS

COOKING KETTLES



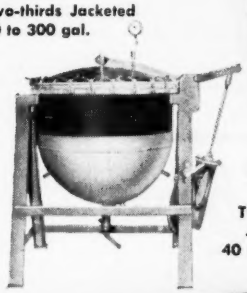
Style C
Two-thirds Jacketed
5 to 100 gal.

Style A
Two-thirds Jacketed
5 to 500 gal.



Style B
Full Jacketed
10 to 300 gal.

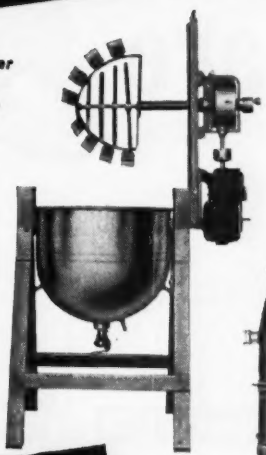
Style CW
Two-thirds Jacketed
80 to 300 gal.



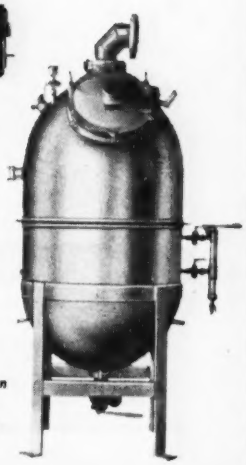
Pressure Kettle
Two-thirds Jacketed
40 to 200 gal.

MIXING AND BLENDING UNITS

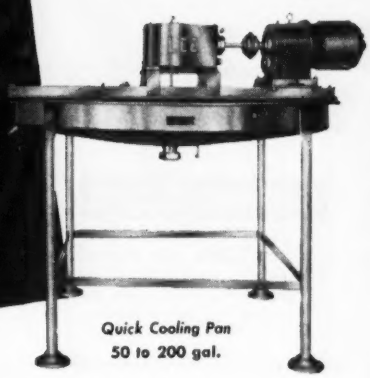
CW3T
Center-line Scraper Agitator Kettle
80 to 300 gal.



A3T
Center-line Scraper Agitator Kettle
25 to 300 gal.



Vacuum Pan
50 to 500 gal.



Quick Cooling Pan
50 to 200 gal.

these LEE Units

WILL REDUCE YOUR PROCESSING COSTS!

Individually designed for a specific processing operation and available in a wide range of sizes to fit your exacting requirements, Lee corrosion-resistant equipment is built to give you long years of peak performance with minimum maintenance.

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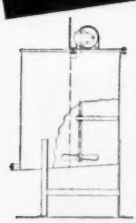
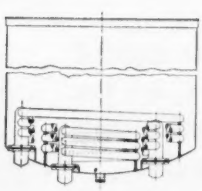
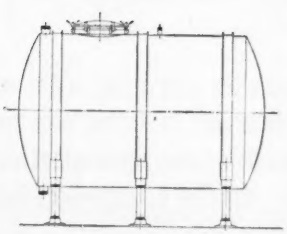
MIXING, COOKING & STORAGE TANKS



Mixing Tank
25 to 500 gal.



Pulp Tank
500 to 2,000 gal.



Storage Tank
100 to 5,000 gal.

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ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

See why Link-Belt screw conveyors are 8 ways better

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Specialized modern machinery assures accurate forming, producing uniform flighting curvature.

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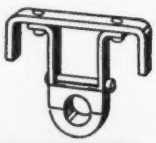
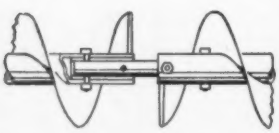
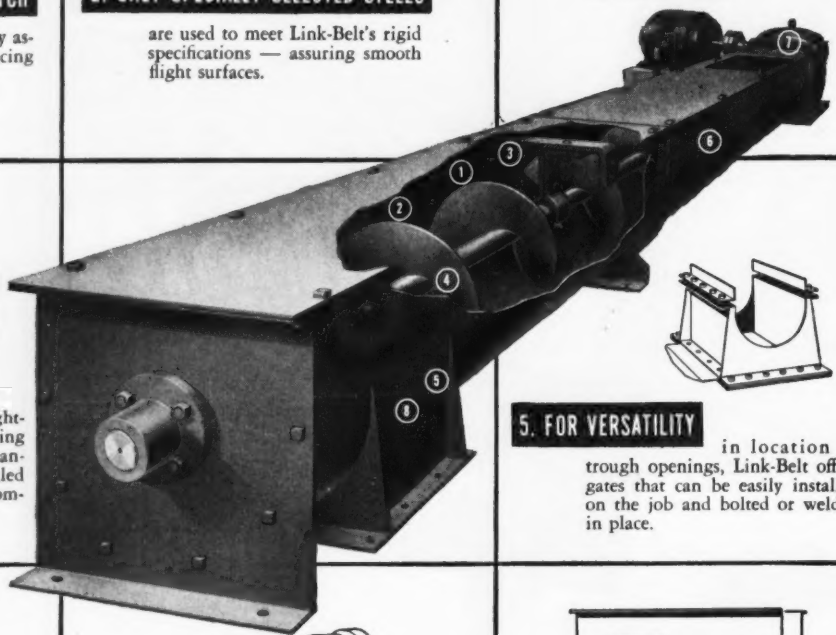
are used to meet Link-Belt's rigid specifications — assuring smooth flight surfaces.



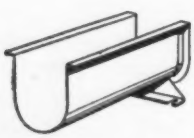
3. HERE'S A WIDE RANGE of hanger styles and mountings with various bearing materials.



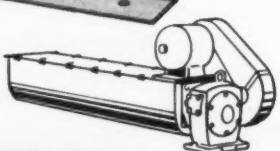
4. FOR YOUR PROTECTION straightness is checked before shipping and extra care is taken in handling and loading. Jig-drilled coupling bolt holes assure complete and easy assembly.



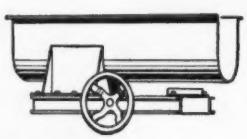
5. FOR VERSATILITY in location of trough openings, Link-Belt offers gates that can be easily installed on the job and bolted or welded in place.



6. YOU'LL DISCOVER that troughs are accurately fabricated to assure better fit of all components. Link-Belt offers a choice of metals to fit your particular application.



7. ONLY LINK-BELT builds a complete integrated line of gear and chain drives, couplings, bearings. One proved source . . . one undivided responsibility.



8. YOUR CHOICE of fixed or detachable plain discharge spouts or gates. Flat or curved slide type gates can be hand or rack-and-pinion operated.

LINK-BELT

SCREW CONVEYORS

These are only a few of the many important differences in screw conveyors. Ask your Link-Belt sales representative or distributor for new 92-page Data Book 2289.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13,278

CONTAINS NO COUMARIN

STRONGER THAN VANILLIN

imitation vanilla bean flavor by Firmenich

the direct and authentic
copy achieved by original research

Vanilla Bean Flavor by Firmenich stems from the vanilla bean. By original research, its components and desirable characteristics have been isolated, identified, and synthesized. By patient and painstaking laboratory techniques, they have been reconstructed for you in a precise and potent flavor material with all the aromatic qualities of the original. Vanilla Bean Flavor by Firmenich comes to you as an economical replacement of pure vanilla extract, of pure vanillin, or to use in combination, in the manufacture of all products that you flavor with this most popular of flavors.

FIRMENICH INCORPORATED
250 WEST 18TH STREET • NEW YORK 11
CHICAGO OFFICE: 612 NORTH MICHIGAN AVE.
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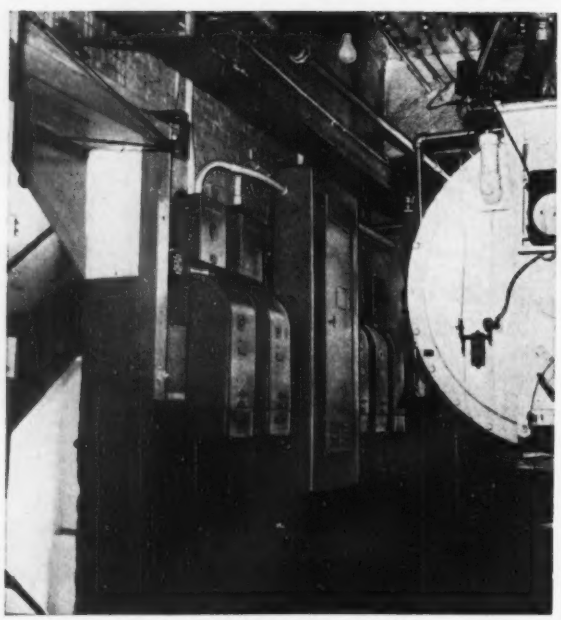
GENEVA • PARIS • LONDON

FIRMENICH & CIE
CHUIT NAEF & CIE

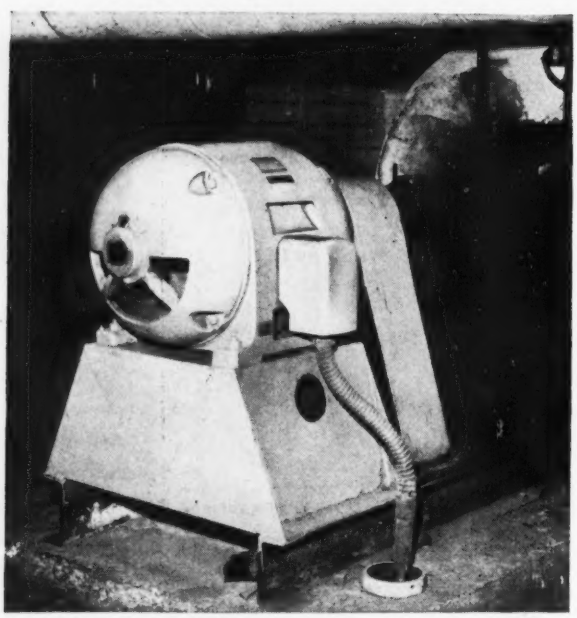
For more information, use coupon on page 187.

TOUGH, VERSATILE TRI-CLAD* MOTOR can be installed anywhere—will provide top performance and long life even under the most difficult operating conditions. Here the G-E drive is mounted on top of the five-roller refiners at Rockwood's Brooklyn plant. The Tri-Clad motor is controlled through G-E equipment conveniently mounted on rear wall.

Rockwood Chocolate Co. finds G-E drives

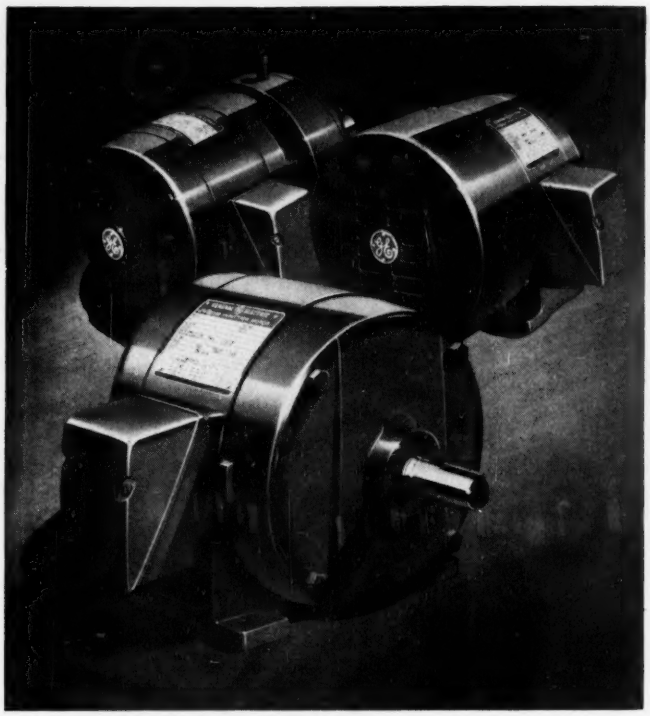


COMPACT G-E CONTROL EQUIPMENT is delivered pretested and factory assembled for easy installation. Operation of these grinders is virtually automatic.

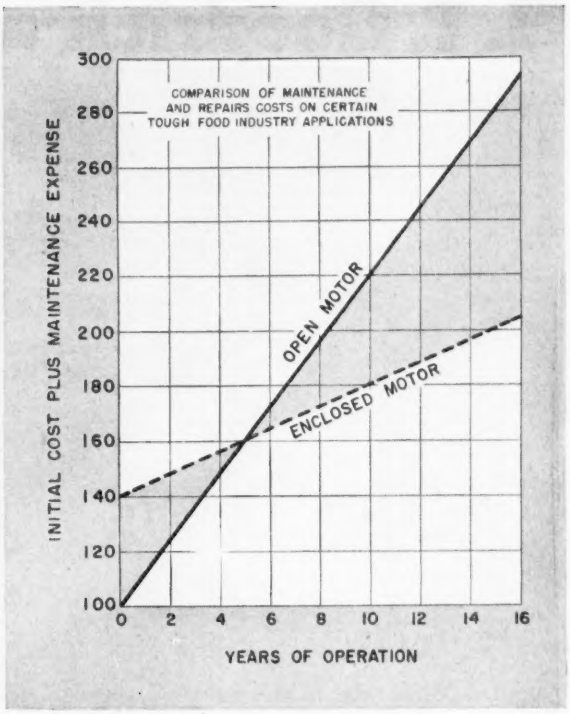


PROPER MOTOR SELECTION can mean long-term savings. Let G-E engineers show you where the Tri-Clad dripproof motor can do the job or where the enclosed motor should be used.

*Reg. Trade mark of General Electric Co.



EVEN LONGER MOTOR LIFE provided by the new Tri-Clad '55' line of gear, dripproof and enclosed motors. A new bearing and grease system greatly reduces maintenance.



YOU SAVE MONEY with the proper motor enclosure. Under tough conditions, in spite of its lower initial cost, an open motor may cost more in the long run than a totally enclosed.

pay off under all operating conditions

"We have experienced long dependable service and low maintenance costs with General Electric drives"—Rockwood Operations Manager

"G-E motors and control are used throughout our plant," says W. E. Ivory, Operations Manager of Rockwood Chocolate Company's big Brooklyn plant, "and we have yet to find an application where they cannot perform the duty." Operating in temperatures ranging from 60° F to 110° F, these G-E drives are giving Rockwood long-term savings.

In Rockwood, as in many food processing plants across the nation, Tri-Clad* motors are giving manufacturers extra years of dependable service. Now, in the first complete redesigning in almost fifteen years, G-E product engineers have developed the new Tri-Clad '55'* motor. This revolutionary motor has all the advantages of the G-E motors installed at Rockwood plus many other significant benefits for the food industry. *Up to 30% lighter and 50% smaller, the new motor has a greater resistance to moisture and improved bearing lubricants. And its greater efficiency gives you higher full-load speed, less power loss.*

G-E application engineers can save you money by helping you select the proper motor enclosure for the specific conditions in your plant. They can determine which of your operations can use open motors, as shown here at Rockwood, and which operations may best be performed by totally-enclosed motors. Although the initial cost of an enclosed motor is slightly higher, its significantly lower maintenance cost may mean long-run economy for you in your tougher applications.

The new Tri-Clad '55' motor is just one of the many electrical components developed by G-E engineers that can prove valuable to you. When planning your next electrical system take advantage of G.E.'s wide experience. Contact your nearest Apparatus Sales Representative or write for Bulletins GEA-6013 on Tri-Clad '55' dripproof or GEA-6012 on Tri-Clad '55' enclosed motors. Section 652-16, General Electric Company, Schenectady 5, New York.

Engineered Electrical Systems for Food Processing Plants

GENERAL ELECTRIC

For more information, use coupon on page 187.

B. F. Goodrich announces

Even grease and salt can't hurt the new Koroseal belt

HERE'S the new Koroseal belt that is making important savings in food processing plants, bakeries and other places like this potato chip plant, where grease and abrasive salt used to shorten the life of canvas, rubber or plastic-coated belts.

Because it's made of Koroseal flexible material, this new B. F. Goodrich belt is not affected by cooking oils, animal fats, most acids—and it stands hard use, rough handling and just about everything else that ruins most materials.

Unlike belts that are just coated with plastic, Koroseal is used throughout this B. F. Goodrich belt, and so resists cracking and peeling, never gets soft or sticky. Oil can't penetrate Koroseal's tough surface, food particles can't grind in. That's why this belt is so easy to clean. A moment with detergent and water, and the Koroseal belt is as clean and new looking as ever.

Other new belts, developed by B. F. Goodrich for food handling, include a thin white Koroseal belt for use in cooling tunnels, and two belts, called Highseal and Kleenseal, that are made of new types of rubber compounds. Their "sight-saving" green color reduces glare and eye strain on packaging and inspection lines.

Find out more about these longer-lasting, work-saving food handling belts. Have your BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. If you don't know the distributor nearest you, write us and we'll have him call you. *The B. F. Goodrich Company, Dept. M-290, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

FOR ALL-AROUND DEPENDABILITY

. . . for sturdy construction . . . for trim appearance . . . for product protection

J&L STEEL CONTAINERS ARE ALL-AROUND WINNERS

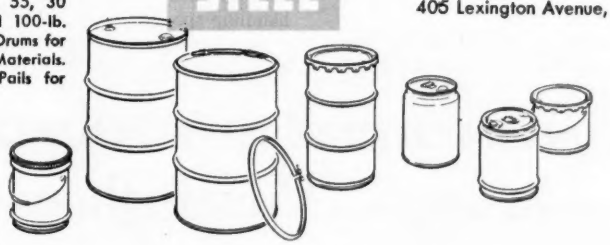
There are sound basic reasons for the all-around dependability of J&L Steel Drums and Pails:

1. **J&L Drums and Pails are made from high quality J&L Steel Sheet.**
2. **J&L Drums and Pails are made with care and accuracy in every detail.**

You can obtain J&L Steel Drums and Pails through plants located in leading industrial centers. You'll find J&L service fast and efficient.

The J&L line includes all types of Closures and Finishes. Bright, colorful decorations may be reproduced to your specifications. Heavy-duty ICC Drums. Light-gauge Drums. 55, 30 and 15 gal. capacity and 100-lb. Grease Drums. Lightweight Drums for Chemical and Powdered Materials. 1-10 gal. capacity Steel Pails for Foods, Chemicals, Oils.

J&L STEEL



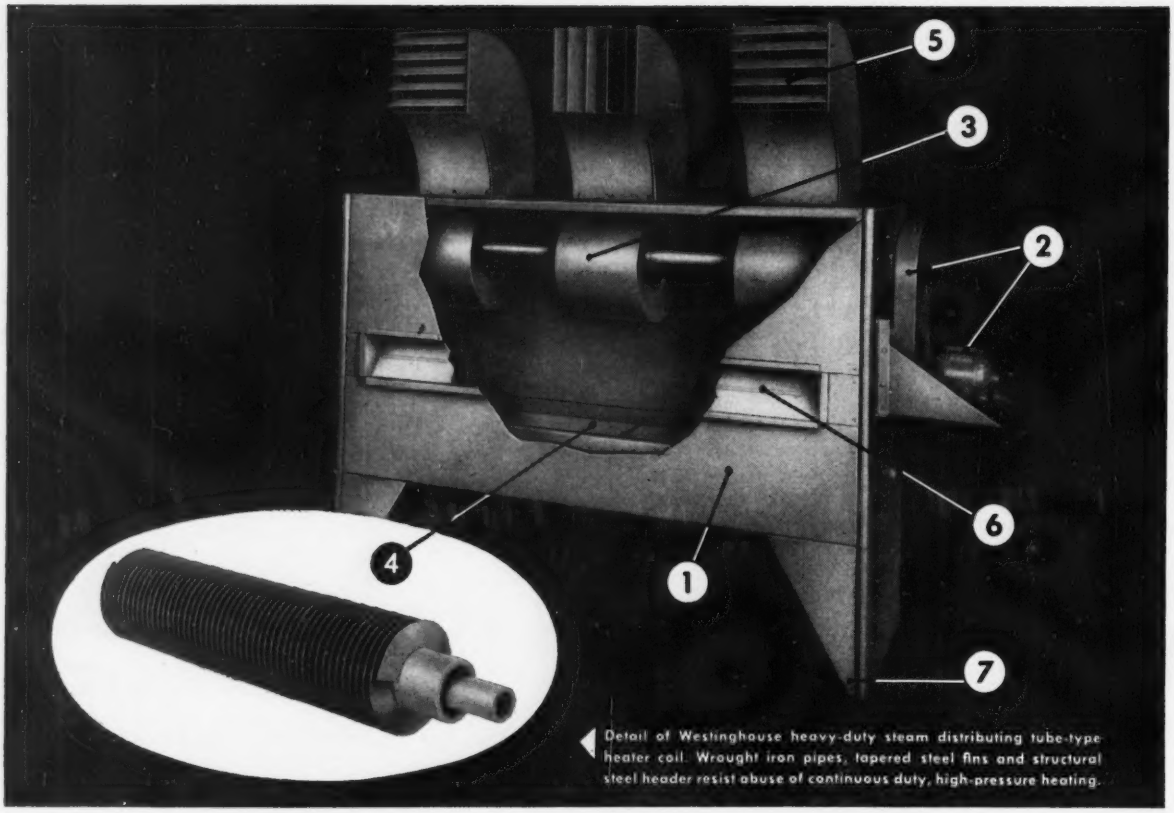
Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*

CONTAINER DIVISION

405 Lexington Avenue, New York 17, New York

For more information, use coupon on page 187.



Detail of Westinghouse heavy-duty steam distributing tube-type heater coil. Wrought iron pipes, tapered steel fins and structural steel header resist abuse of continuous duty, high-pressure heating.

Rugged, Quiet Westinghouse Industrial Heaters... Designed For Continuous Heavy-Duty Systems!

Seven Features Assure Dependable, Versatile Coverage of Large Areas

Westinghouse Industrial Heaters supply ideal heat under difficult conditions. In plant, warehouse, garage and similar buildings, these heaters efficiently blanket large work zones, even those with high ceilings, frequently opened doors and expansive window areas. They also supply make-up air for exhaust systems . . . may be used to circulate ventilating air during warm seasons. Capacities in six sizes range up to 2,500,000 BTU/hr . . . 25,000 cfm . . . 200 psig steam pressure.

Each Westinghouse Industrial Heater is a complete unit. That's why each can be placed where it will do the most good . . . whether on floor, or wall (upright or inverted), or suspended from ceiling. Economically selected and scientifically grouped, Westinghouse Industrial Heaters satisfy the needs of areas of any size or shape, and can be readily relocated to suit plant layout changes.

Westinghouse Industrial Heaters have a line-up of features that is unique:

1. Casings are rugged heavy-gauge steel. Front and back panels are easily removed.
2. Standard motors have adjustable V-belt drive on units with motors up to 5 HP.
3. Powerful, yet quiet, fans are multiblade centrifugal type mounted on a common shaft. Blades are forwardly curved.
4. Efficient steam coils are heavy-duty or general purpose. Former are wrought iron for extra-long life (see detail shown above); latter are standard or steam distributing copper-tube type.
5. Discharge outlets and deflectors permit flexible discharge arrangements. Result: most advantageous airflow and heat distribution pattern.
6. Bypass damper arrangement permits constant air modulation. Standard arrangement permits steam modulation.
7. Rounded corners, smooth surfaces eliminate accidents, minimize dirt.

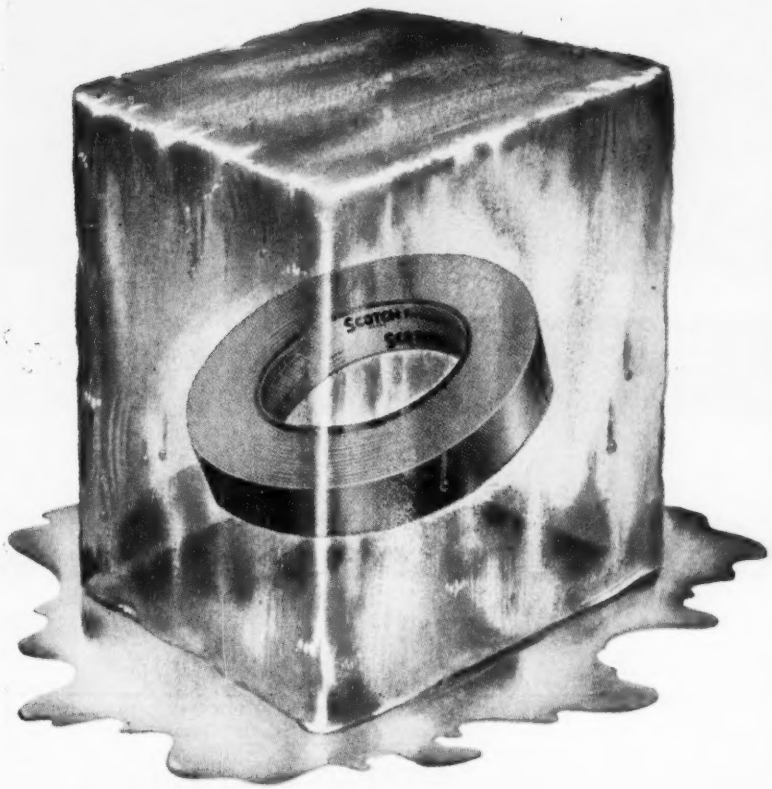
These features are backed up with a Westinghouse-Sturtevant exclusive—a single equipment warranty with undivided responsibility. This unit responsibility is your greatest guarantee of dependable performance for years to come. For complete details call on the Westinghouse-Sturtevant air handling specialist conveniently located in your area. Or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse

J-80412

TAPE that sticks in freezing cold



Tough, moisture-resistant tape that sticks at a touch . . . holds tightly to wax, or plastic treated papers . . . even at extremely cold freezer temperatures! Available in 12 attractive colors to match or contrast with printed cartons or wrapping papers. For complete information, and free sample, write on your letterhead to Dept. FE-84.

ACETATE FIBRE . . . one of **300** PRESSURE-SENSITIVE TAPES for industry, trademarked

REG. U. S. PAT. OFF.

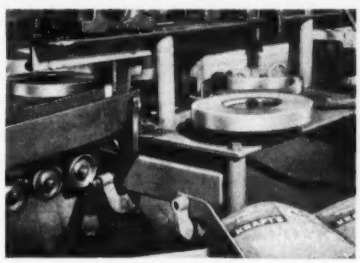
SCOTCH BRAND®

The term "Scotch" and the plaid design are registered trademarks of Minnesota Mining and Manufacturing Company, St. Paul 6, Minnesota. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ontario, Canada.

3M COMPANY

LOOK what you can do with it!

SECURE PACKAGING for cold cabinet displays is easy with "Scotch" Brand Tape No. 710. Hams, bacon, meat cuts, etc., are attractively wrapped with this tight-sticking tape.



EYE-APPEAL can be added to combination "deals" with "Scotch" Brand Acetate Fibre Tape *in colors*. Here, wax-treated cartons are banded together for cold cabinet displays with a "Scotch" Brand Package Bundler.

FASTER WRAPPING of ice cream packages is accomplished with "Scotch" Brand Tape No. 245 and a "Scotch" Brand Box Sealer. Package is simply passed over roller; pre-determined length of tape is automatically applied.

FREE BOOKLET!

MINNESOTA MINING AND MFG. CO.
Dept. FE-84
St. Paul 6, Minn.

Please send me your new booklet describing the many uses for "Scotch" Brand Acetate Fibre Tapes.

NAME.....

COMPANY.....

ADDRESS.....

For more information, use coupon on page 187.

IN BAKERIES, *ElectroniK temperature controllers regulate ovens to split-degree precision . . . speed recorders check baking time in continuous ovens. Mixture consistency recorders in many bakeries also take the guesswork out of dough mixing. Photo courtesy of Burny Bros. Bakery, Chicago.*

IN ICE CREAM PLANTS, *ElectroniK instrument located in a quality control laboratory, saves many man-hours of labor by recording temperatures in scattered freezing rooms, mixing tanks, hardening tunnels. Photo courtesy of Goldenrod Ice Cream Co., Chicago.*

ElectroniK instruments continue

Progress in instrumentation...through electronics

Before 1940, most instruments measured by mechanical means. Many of them still do. Look inside the thermometers, flow meters and pressure gauges around your plant, and you'll see mechanical levers, springs and spirals.

To get more accurate ways of measurement, industrial instrumentation borrowed from the scientific laboratory a delicate device called the galvanometer. To simulate the scientist's actions of watching a needle and turning dials, mechanical instruments were developed . . . and they were full of mechanisms as complex and fragile as the works of a watch.

Then along came something entirely new . . . the *ElectroniK* instrument. For the first time, it applied the science of electronics in a practical way to the science of measurement. It used tubes similar to those in your home radio to do the work that formerly required intricate mechanical devices. Because it was much more sensitive, it made possible greater precision than ever before. And because it measured *continuously* and quickly, it told people things about their process operation that they had never known. This higher standard of performance in measurement soon opened the way to advanced types of automatic control.

Best of all, electronics increased the dependability of precise industrial instrumentation. Far from being complex, *ElectroniK* instruments are extremely simple in design and construction. By the thousands, they have proved their ability to stay on the job with an absolute minimum of routine attention.

IN HATCHERIES, *yield and health of poultry are improved by closer control of temperature and humidity.* ***ElectroniK*** *instruments on this central control panel check temperatures of twenty incubators at Trask Turkey Farms, Black River Falls, Wisconsin.*

to make news *in food processing*

RIGHT in the forefront of the food industry's growing trend toward automation, you'll find *ElectroniK* instruments helping to make possible new, advanced techniques in processing. The precision, versatility and speed which these instruments afford have implemented such innovations as aseptic canning, continuous neutralization of cream, concentration and freezing of citrus juices, and many others.

ElectroniK instruments are constantly helping pave the way for the realization of new ideas . . . some of which are pictured here. *ElectroniK* instruments can measure just about anything. Temperature, pH, flow, weight and consistency are but a few of the variables for which they are adapted. And in the field of control, an increasingly important facet of food processing, these instruments can provide any type of regulation, from simple on-off to highly refined proportional action.

As important plus values, they save labor . . . by concentrating a large number of records on a single chart, where supervisors can watch process operation without touring the complete plant. They improve quality . . . by controlling conditions with the hair-splitting precision essential to the success of modern processes. They reduce maintenance costs . . . by eliminating the possibilty of the breakage of capillary tubing, and by their ability to keep on the job with practically no attention.

Your nearby Honeywell sales engineer will be glad to discuss how these instruments can be utilized in your own food production. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

● **REFERENCE DATA:** Write for Catalog 1521, "*ElectroniK* Recorders", and for Data Sheets on specific food processing applications.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

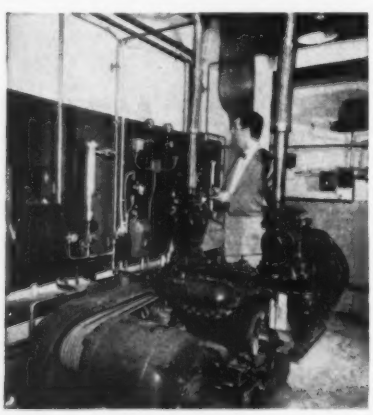
First in Controls

Massachusetts Wholesale Food Terminal is one of the world's newest and largest cooperatively owned meat plants.

At new Boston terminal:

Over a million cubic feet of controlled cold with "Freon"* safe refrigerants

Trimming beef in a shipping room, where temperatures are kept at a workable 50°F.



Checking one of the 63 compressors in building "A," all of which use "Freon" refrigerants.

Ninety-eight compressors, ranging in size from 3 to 25 h.p. and totaling 542 tons' refrigeration capacity, protect meat in 1,356,828 cubic feet of cooling and freezing space! That impressive statistic applies to the new Massachusetts Wholesale Food Terminal, which houses as many as 26 separate meat-handling firms under one roof.

Within the plants, each storage unit is divided into three compartments. In a small freezer compartment temperatures stay at 0°, while a larger beef-holding chest maintains 34°F. The current day's supply of meat is kept in a shipping and fabricating room, at a comfortable-to-work-in 50°F.

To handle this precise operation, architects and engineers recommended refrigeration systems using "Freon" refrigerants. Important was the safety factor in "Freon" refrigerants, bringing dependable protection from food contamination. And the compactness of systems using "Freon" refrigerants meant that more space could be put to profitable use.

Look into the reasons why the owners and managers of so many modern food-handling plants choose equipment charged with "Freon" refrigerants. These refrigerants are safe . . . nonflammable, nonexplosive, virtually nontoxic. Get further information by writing to E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

KINETIC

FREON

REG. U.S. PAT. OFF.

SAFE REFRIGERANTS

*"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

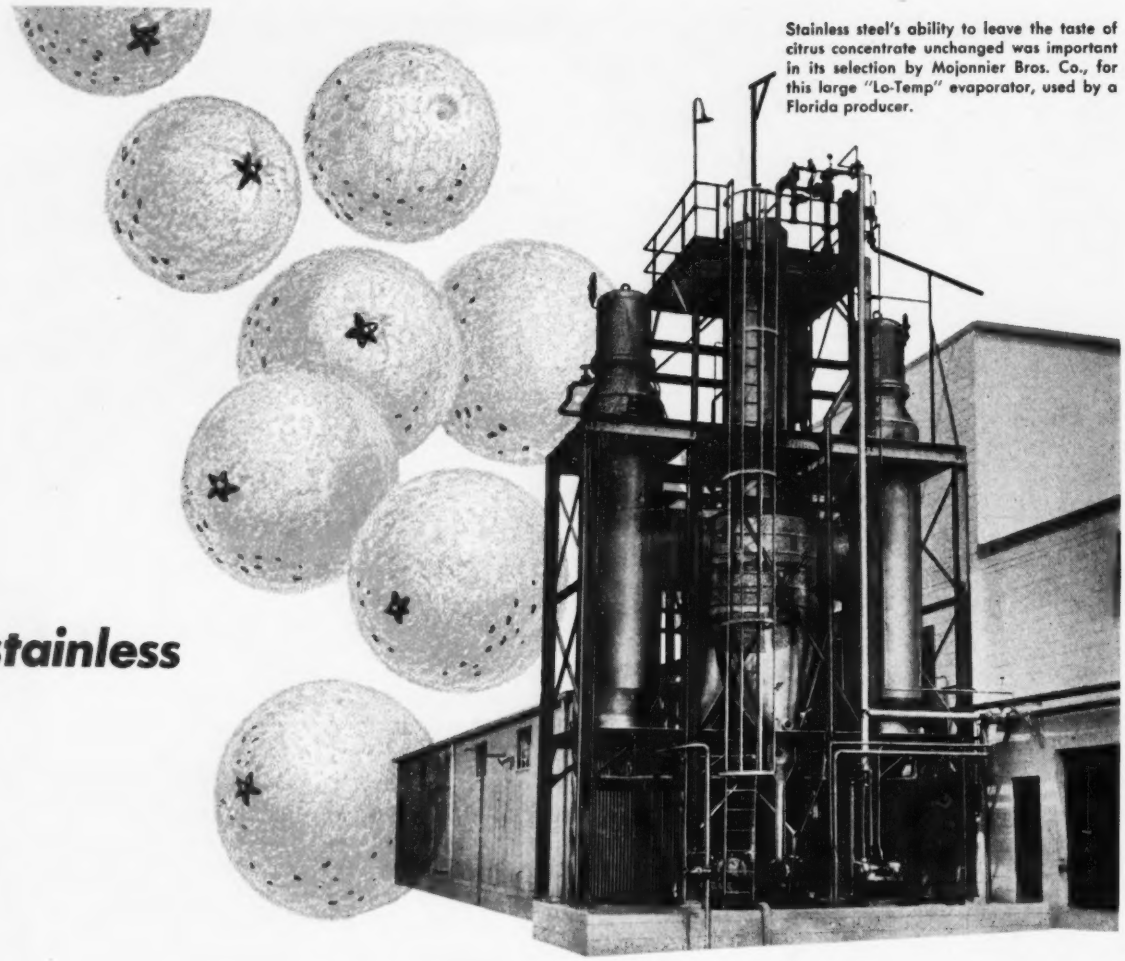
DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

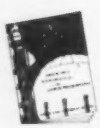
There's nothing small about the market for SUCARYL®
(Cyclamate, Abbott)
25 million people carry a lot of weight—too much for their own good. They make obesity our No. 1 health problem—and present a tremendous national market for SUCARYL-sweetened products.
This is a market you should be in. More than ever before, diet-conscious people are out shopping for low-calorie foods and drinks. Most of these people know SUCARYL. They know it offers true sugar-like sweetness without added calories or tell-tale bitterness.
No matter how you look at it—nationally or in terms of your own local market—SUCARYL-sweetened products are tomorrow's big plus-profit line in the food field. Make your inquiry today: Chemical Sales Division, Abbott Laboratories, North Chicago, Illinois.
Abbott
SPECIAL BOOKLET AVAILABLE!
Write today for your free copy of "Making the Most of the Dietetic Market with SUCARYL."

For more information, use coupon on page 187.



Stainless steel's ability to leave the taste of citrus concentrate unchanged was important in its selection by Mojonnier Bros. Co., for this large "Lo-Temp" evaporator, used by a Florida producer.

stainless makes frozen juice concentrate **taste good**



FREE—Send for your personal copy of "Making the Most of Stainless Steels in the Food Processing Industry." It will help solve many of your materials selection problems. And, for detailed information on stainless in *Dairy*, *Brewing*, *Meat* and *Soft Drink* Industries, ask for the specific Crucible books covering them.

Without stainless steel, chances are the great and growing citrus concentrate industry would not exist. That's because stainless, being easy to clean, cuts down chances of microbial growth . . . successfully resists attack by fruit juice acids . . . does not affect the distinctive flavor of citrus juices.

And that's why Crucible Rezistal® stainless steel is liberally used in such processing equipment as the Mojonnier Bros. Lo-Temp Evaporator, shown here installed in the plant of a Florida citrus concentrate processor.

Of course, Crucible stainless steel handles many other foods, too. In vegetable and fruit processing . . . for meat and fish packing . . . vegetable oil refining . . . milling, baking, candy making . . . and many, many more — stainless sets the pace as the *preferred standard* for long equipment life with no effect on the product.

Remember, too: Crucible stainless steel is *really practical* to work with. You can bend it, shape it, weld it, machine it — make any equipment, no matter how complex, out of Crucible stainless. But let us help you decide how to put stainless steel to work for you. For fast action — call Crucible.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

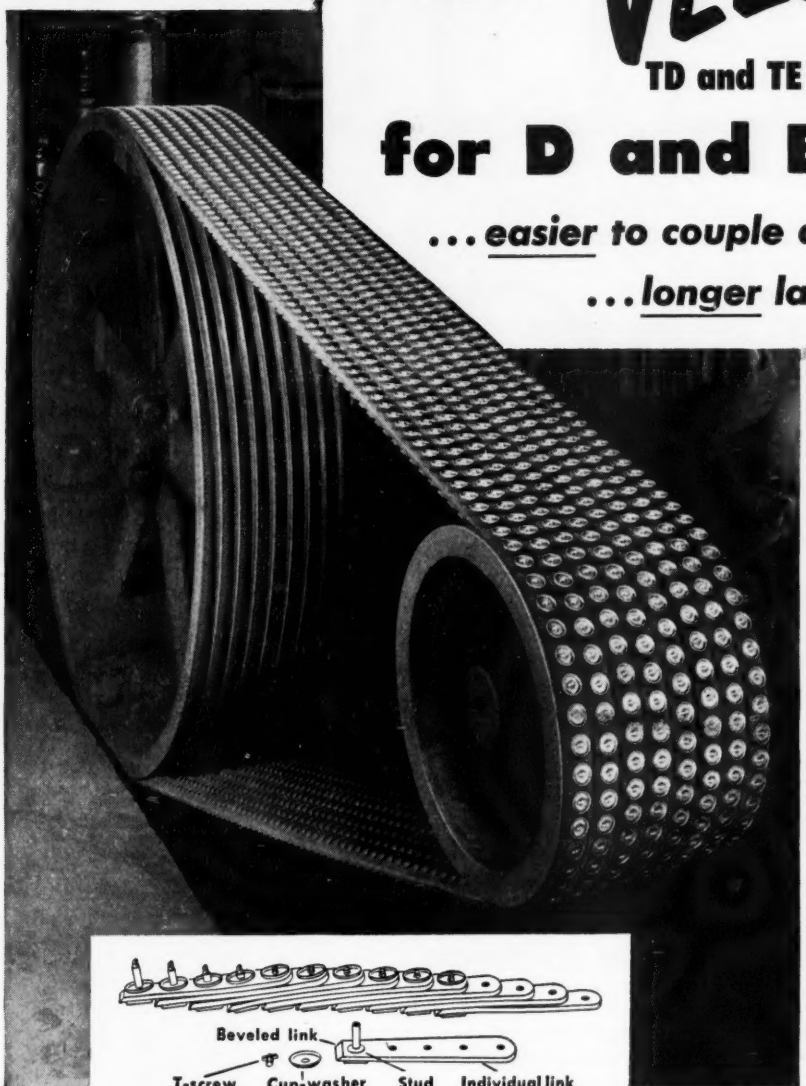
NEW VEELOS

TD and TE Adjustable V-belts

for D and E Drives

...easier to couple and uncouple

...longer lasting



This detailed line drawing of the new Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job... easier!

Now get the v-belt that's been especially developed for D and E drives—the new, patented Veelos TD and TE adjustable v-belt!

This new Veelos has advantages unmatched by any other v-belt. It is *installed quickly* without removing the outboard bearings found on most D and E drives. It is the easiest v-belt to couple and uncouple ever developed. Cup-washers and T-screws join links together to form individual belts of any length. Veelos TD and TE *lasts longer* because new high-tensile strength links plus the new stud, cup-washer and T-screw design give *added strength* —combines this added strength with *maximum flexibility* for cooler, smoother running.

Install this new Veelos TD and TE v-belt on your D and E drives. Prove to yourself why there's no v-belt that can match the performance, the efficiency and the economy of Veelos TD and TE.

Get the complete story of this great new v-belt for D and E drives. Send the coupon now for new 8-page illustrated catalog.

VEELOS
THE LINK
V-BELT

Veelos is known as Veelink outside the United States.

MANHEIM MANUFACTURING & BELTING CO.
605 Manbel St., Manheim, Pa.

Please send copy of your new Veelos TD and TE v-belt catalog.

Name.....

Company.....

Address.....

.....

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

For more information, use coupon on page 187.

Precision food package printing

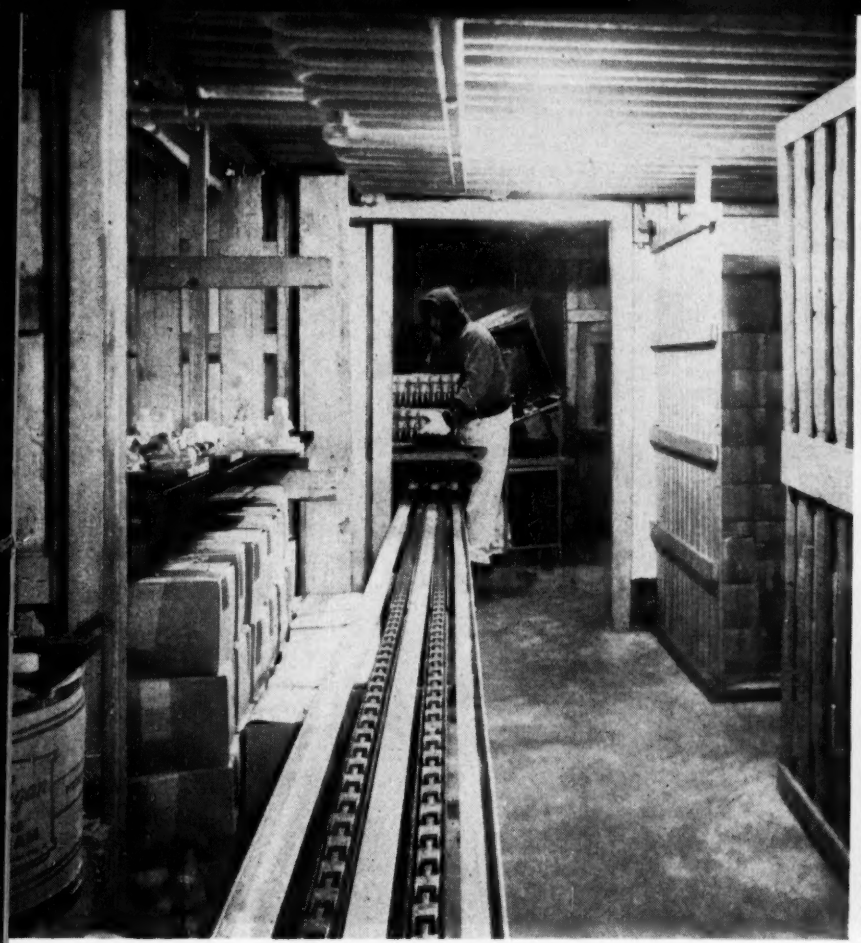
At Shellmar-Betner, no step in food package printing is left to chance. We ourselves manufacture every printing cylinder we use. We record, electronically, the wave length, brightness and purity of each color we print. We maintain a stroboscopic accuracy check throughout each printing run. The results: true color, precise registry, and crisp, clean package printing. This care works for you—as it works for hundreds of other food package buyers—whenever you call on Shellmar-Betner.

CONTINENTAL CAN COMPANY

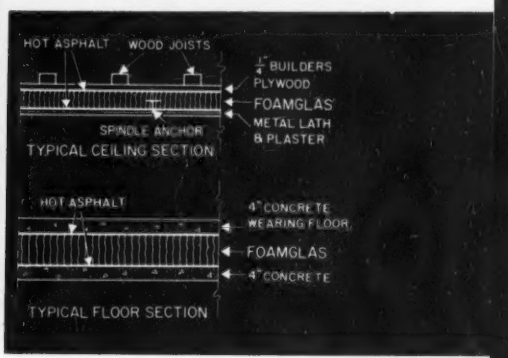
SHELLMAR-BETNER

FLEXIBLE PACKAGING DIVISION

MT. VERNON, OHIO



In the hardening room (left) at their Sunny Ridge plant and in coolers at the Germantown Branch (above), Abbotts Dairies have used FOAMGLAS to replace deteriorated organic insulating materials.



"Ten years of outstanding insulating performance proved FOAMGLAS stays dry!"

states P.J. Stromback, Chief Engineer, Abbotts Dairies, Inc., Philadelphia

"Our ten years' experience with FOAMGLAS has proved to us that this unique cellular glass insulation is absolutely impervious to moisture and even unaffected by ammonia," states P. J. Stromback, Chief Engineer, Abbotts Dairies, Philadelphia. "The need for major reconstruction of several milk cooling and ice cream hardening rooms led us to make exhaustive characteristic studies of the various kinds of insulation available. The results of these studies, plus the impressive ten-year performance record of our initial FOAMGLAS installation, have led us to use it in all three of our plants.

"FOAMGLAS has proved to be completely waterproof, despite frequent washdowns of our refrigerated space, thus retaining its full insulating efficiency. Since FOAMGLAS is inorganic, it isn't harmed even by occasional ammonia leaks. We've found that its strength and rigidity protect us, too, from the danger of sinking floors and bulging walls. Since FOAMGLAS is vermin-proof, it has helped us avoid the rat problem."

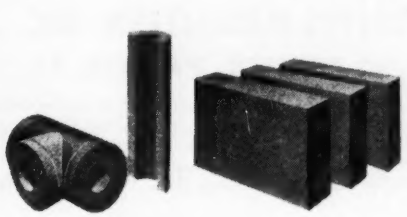
Mr. Stromback's report concludes: "FOAMGLAS has given us outstanding insulating performance while helping to keep our maintenance costs at a minimum. We'll continue to use it to replace other insulation in reconstruction of refrigerated spaces at our Sunny Ridge, Germantown Branch, and 31st and Chestnut Street plants. Construction of a new milk storage box, using FOAMGLAS, has just begun at our Ambler plant."

FOAMGLAS has proved its outstanding multiple benefits in long service at Abbotts Dairies. Why not investigate the many benefits *you* will get when you insulate with FOAMGLAS? Write today for a sample and our booklet describing the use of FOAMGLAS to insulate cold storage space.

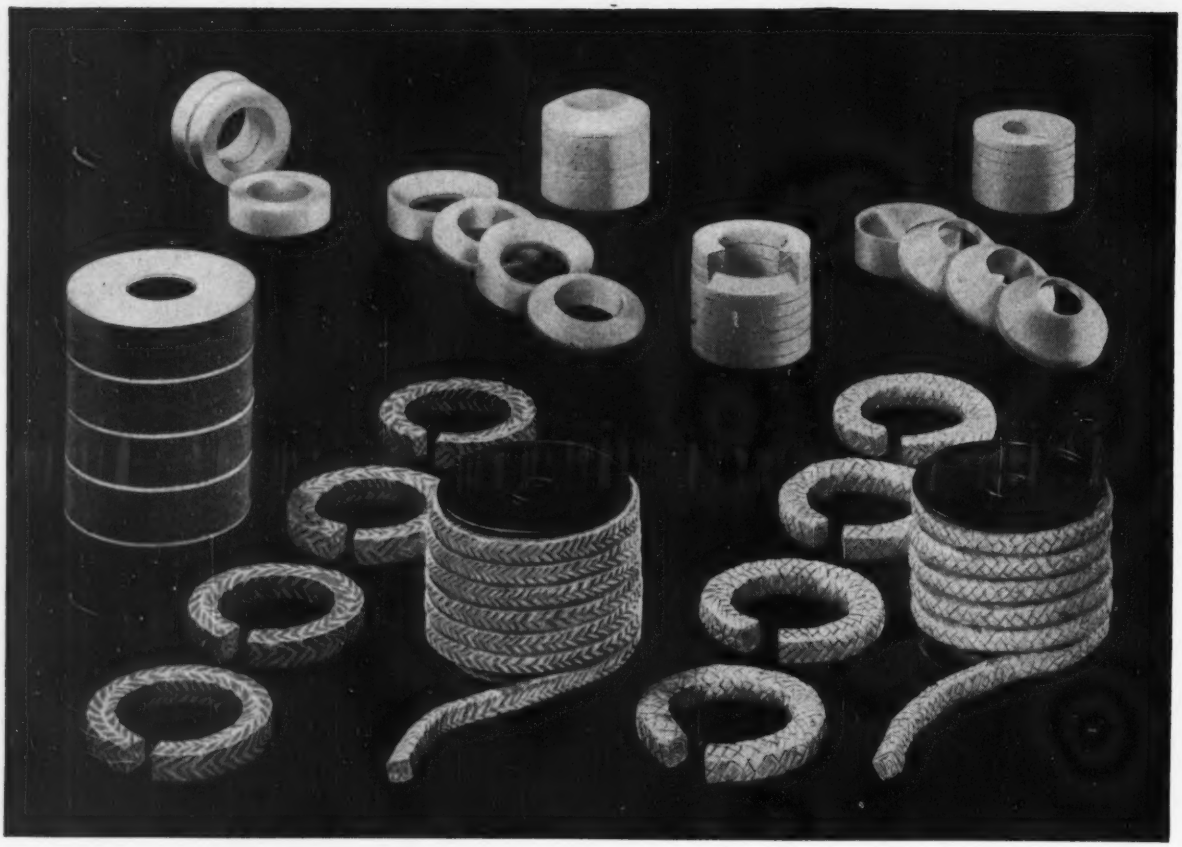
PITTSBURGH CORNING CORPORATION • Dept. O-84 • One Gateway Center • Pittsburgh 22, Pa.

FOAMGLAS®

the cellular, stay dry insulation



Pittsburgh Corning also makes PC Glass Blocks



Why R/M Teflon* Packings are so ideal for sealing food processing equipment

Consider first the virtues of "TEFLON": it is non-adhesive and non-contaminating. It shows no reaction against any chemicals which might be used in food processing. It is unaffected by any known industrial acids and caustics; it has no known solvent; its water absorption is zero.

R/M No. 840-W, lower left in the photo above, is an excellent example of the quality of the line. This packing, designed for valve stems, is made of braided asbestos yarns which have been impregnated with "TEFLON." The asbestos in the packing cuts the cost of pure "TEFLON," compensates for thermal expansion, and resists materials handled.

No matter what you are packing—pumps, valves, retorts, hydraulic presses, homogenizers, or what have you—R/M can supply you with the proper packing for the job. The complete R/M "TEFLON" products line includes rods, sheets, tubes, tape, packings, gaskets, rings and irregular shapes. For complete information, see your R/M distributor.

**Du Pont's trade-mark for its tetrafluoroethylene resin*

R/M MAKES A COMPLETE LINE OF PACKINGS AND GASKETS—AVAILABLE FROM YOUR AUTHORIZED R/M DISTRIBUTOR

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, MANHEIM, PA.

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville Ind.; Peterborough, Ontario, Canada.

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Bowling Balls

Helping you do what Nature didn't

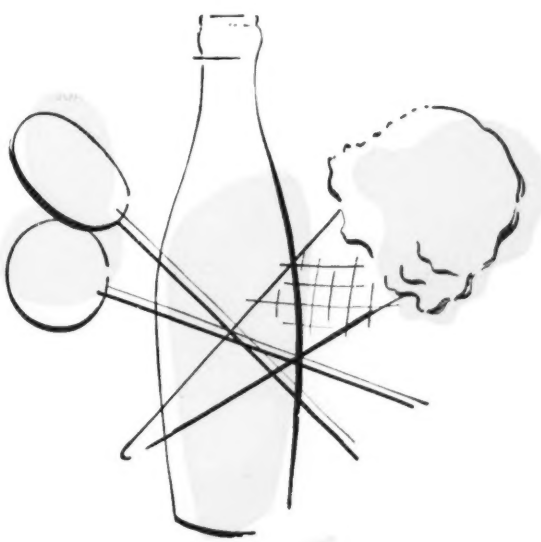
National

CERTIFIED FOOD COLORS

Foodstuffs vary from day to day and season to season. But processed foods and beverages must have uniformly appetizing color all year 'round.

Helping food processors to add the tinge of color that compensates for Nature's deficiencies has been our business these many years. Recognizing our responsibility, we go well beyond the necessities of certification to standardize the pure-dye strength, shade and composition of National Certified Colors.

National Foods Colors have been used for years by the most respected concerns in the food and beverage industry. They have done much to increase consumer appreciation and enjoyment of fine foods. Since the finest colors cost so little, why not standardize on National Food Colors?



CERTIFIED COLOR DIVISION

NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION • 40 RECTOR ST., NEW YORK 6, N. Y.

Boston Charlotte Chicago Philadelphia Portland, Ore. San Francisco Toronto

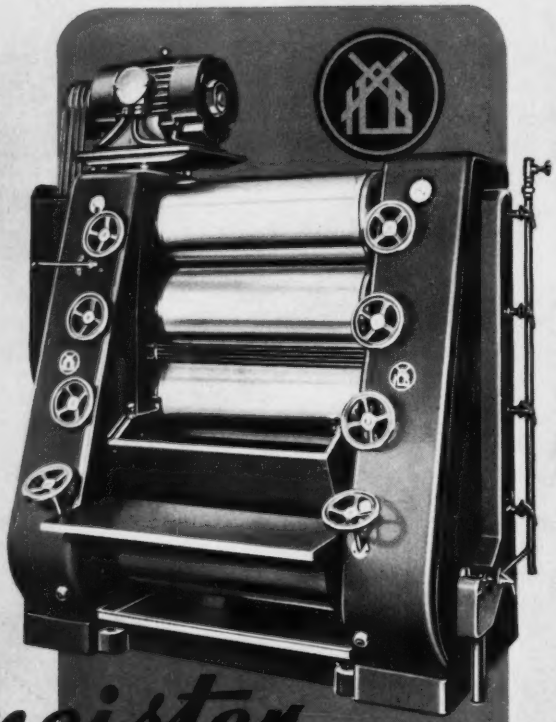
Allied Chemical

You will get volume production and Maximum Fineness-

WITH THE

Bauermeister

5-ROLL REFINER (TYPE F.W. 50)



Look at the list of special features below . . . you'll see why this big machine will pay you big dividends in refining every day of its long life. You'll get consistent fineness of texture at high speed too, which will keep your reputation for quality high. You'll get this performance at a low labor cost because of the many automatic features. You'll get durable, reliable performance, high production too, from the quality materials and fine workmanship always found in machines made by Bauermeister. Write today for catalog giving full information.

ACCURATELY GROUND ROLLS of uniform hardness, plus efficient water cooling, insures perfect transfer of the paste from roll to roll, with better crushing and refining.

ROLL ADJUSTMENT of each pair of rolls independent of the others. Adjusting hand-wheels easily accessible in front of the machine.

ROLL SPEED: 220 rpm maximum

DELIVERY SCRAPER KNIFE, improved type, needs little re-sharpening or adjustment for long operating periods.

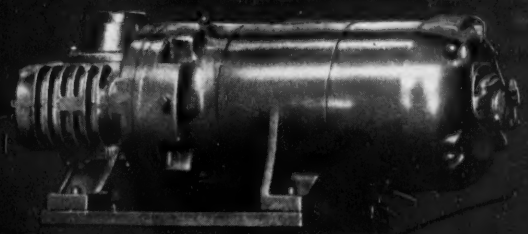
GEARS: machine cut helical type, running in an oil bath for quiet operation.

ROLL DIMENSIONS: Dia 15 3/4", working length 39 1/2"

GEVEKE & COMPANY, INC.

25 BROADWAY, NEW YORK 4, N. Y.

MANUFACTURERS' REPRESENTATIVES • SPECIALIZED MACHINERY AND EQUIPMENT • FOUNDED AMSTERDAM 1876 •



See how easily the standard electric motor, standard gear reduction, standard electric brake combine into a drive that gives the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features . . . all in one compact unit. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 430 to 1 ratio . . . with electric brakes . . . with fluid-drive . . . with mechanical or electronic variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best power drive for you.

standard units easily combine into special purpose drives

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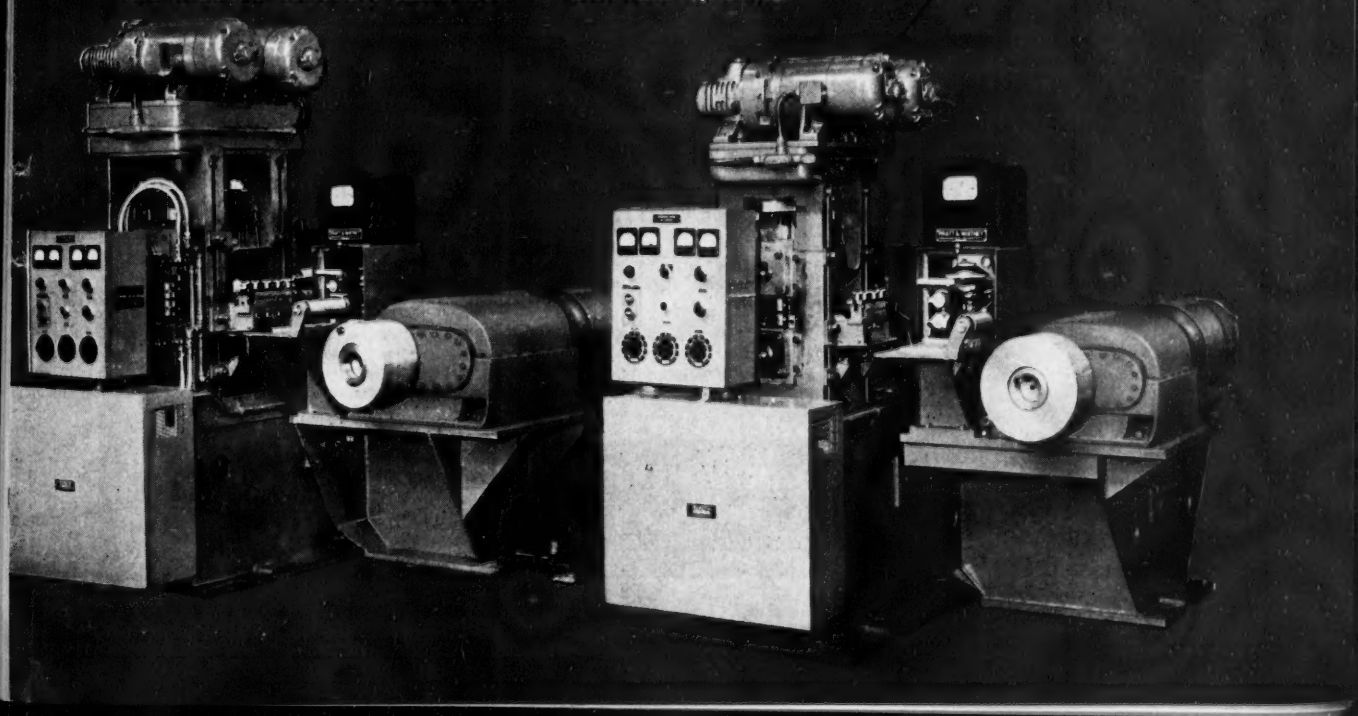
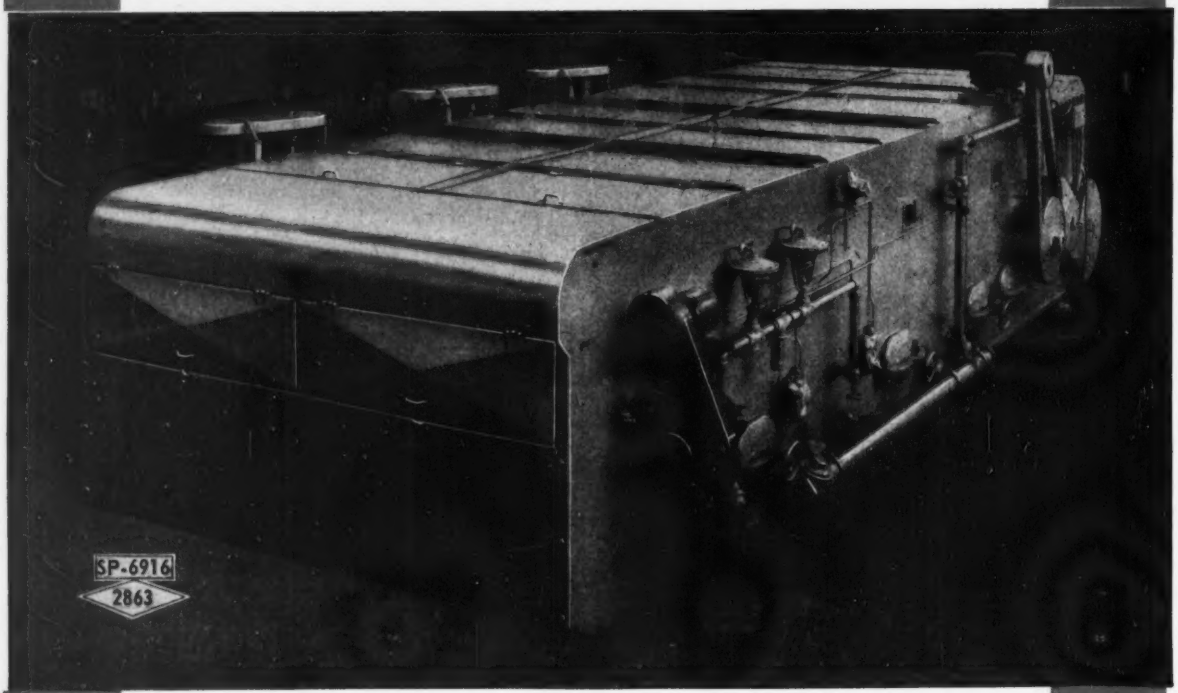


THE MEYER *Cataract* FOOD PROCESS UNIT



for Pasteurizing, Cooling and Exhausting

A MEYER Cataract Food Process Unit is backed by 50 years experience in building efficient bottling equipment including Pasteurizers for the Brewing and other Beverage Industries and processing units for the grape Juice Industry.

The MEYER Cataract Food Process Unit is built for efficient processing. Food products may be cooled, heated or heated and cooled with the MEYER Food Process Unit at very high efficiency. The entire process of heating the product to a pre-determined temperature and/or a subsequent cooling, is accomplished within a single unit. It has proved highly efficient in a wide variety of applications, since 1939.

Designed to minimum floor space, feed at one end, discharge at the other end; also built in Multier design where floor space is limited.

The entire cooling or heating or heating and cooling operates on a continuous basis, under mechanical control. Product handling, waste water and labor requirements are minimized. Sanitary design provides for quick cleaning and visual inspection of all surfaces contacting the product packaged.

The MEYER Cataract Food Process Unit is designed for products in any and most forms of the prevailing size of glass or tin containers, likely to be adopted, from any diameter to 12½" high and particularly where one unit is to handle all types. Provisions can be made to handle containers of larger heights. Tell us of your requirements.

USED THE WORLD OVER — Dumont — BOTTLING EQUIPMENT — 50th

GEO. J. MEYER MANUFACTURING CO.
CUDAHY, WISCONSIN

For more information, use coupon on page 187.

FLEXIBLE MILK PACKAGING BUILT OF ENDURO

This is Ex-Cell-O's "Pure-Pak" milk-cartoning machine. It allows dairies which wish to use several types of containers to package a portion of their product in cartons... and do it economically.

The "Pure-Pak" is built largely of Republic ENDURO Stainless Steel. All milk-contacting surfaces are ENDURO. This results in several advantages: (1) good appearance, (2) reduced cleaning and maintenance costs, (3) improved morale and housekeeping. Above that, stainless steel definitely is required by "Pure-Pak" purchasers.

For good reasons. ENDURO does not contaminate metallically. It resists rust and corrosion. It is easy to clean and to keep clean. It looks attractive when new, stays that way for years. It is strong and tough, able to soak up plenty of punishment without showing it. ENDURO construction pays its way, pays a profit.

Food-processing equipment of all types for all uses currently is manufactured in ENDURO by leading suppliers. Republic will help you locate them. Write:

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
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REPUBLIC STEEL

REPUBLIC ENDURO STAINLESS STEEL

Other Republic Products include Titanium, Tin Plate, Steel and Plastic Pipe, Bolts and Nuts, Tubing, Barrels and Drums, Lockers, Shelving

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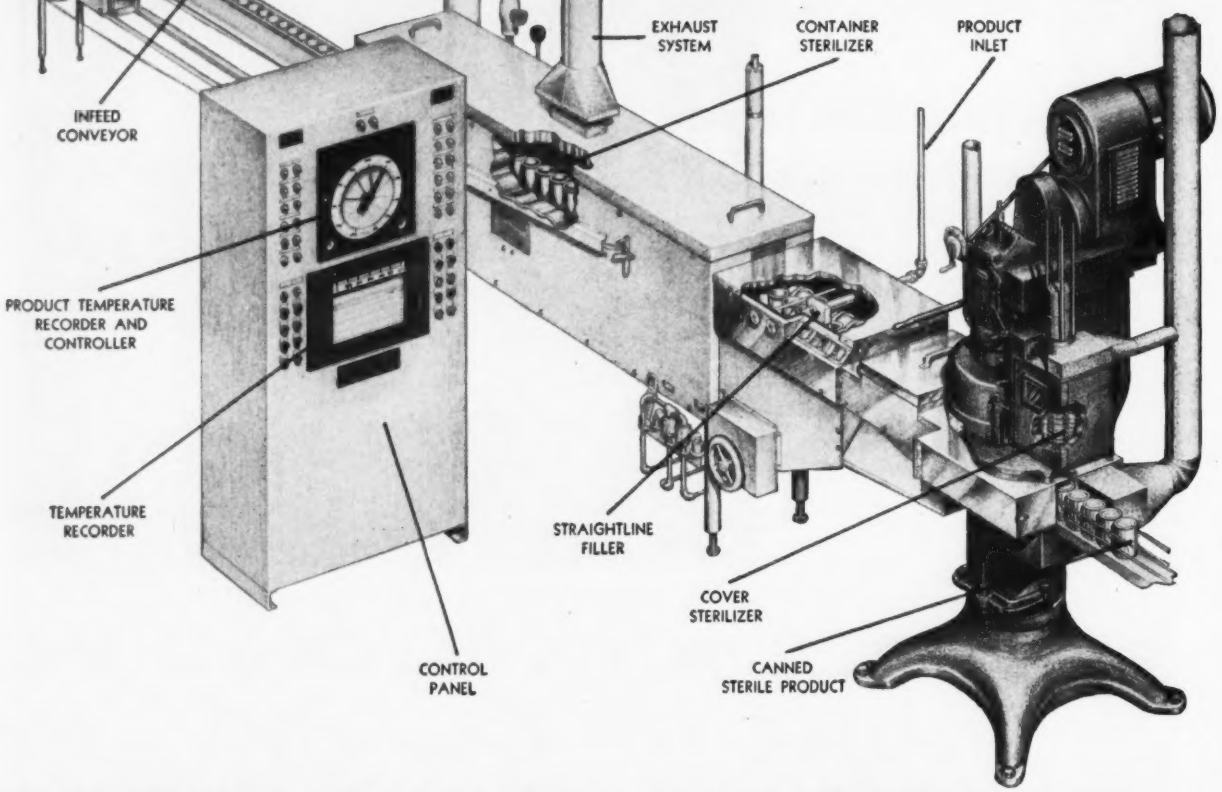
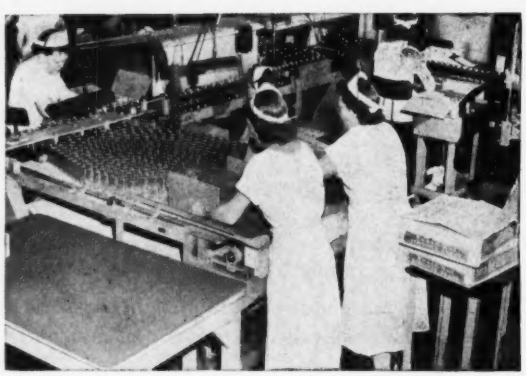
The Inside Story



COST-CUTTING EXAMPLES OF OTHER STANDARD AND

• W. F. & John Barnes offers the food processor a highly successful Coordinated Designing, Engineering, and Equipment Manufacturing Service. During the past eight years many cost-cutting methods have been developed through the designing and building of special mechanized handling and processing equipment. At Barnes you'll find competent engineering counsel, dependable facilities, and over 75 years of equipment building experience at your disposal. We'll be glad to make an analysis of your processing methods.



EMPTY GLASS SINGLE FILERS — Handle up to 600 jars per minute with minimum breakage. Design permits handling different sizes of jars. Semi-standard units available for odd-shaped jars or bottles.

W. F. & JOHN BARNES

Designers and Builders of Better Machines and Equipment Since 1872

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on Aseptic Canning

THE MARTIN ASEPTIC CANNING SYSTEM

Products with nature's true taste and eye appeal . . . with all the health-giving factors nature endowed them with . . . are now being packed through the use of the Martin Aseptic Canning System. Delicately flavored, heat-sensitive products that heretofore were considered impossible to can . . . like pureed bananas, fresh milk, cream, and other dairy products . . . are now processed without loss of flavor. All this is made possible by the Martin Aseptic Canning System, which permits the advantages of short-time, high-temperature sterilization.

In addition to offering the sales advantages of a vastly improved product, there are both mechanical and cost advantages afforded with the Martin System. Food processing is now an efficient, continuous, uninterrupted operation, entirely eliminating batch handling, retorting, and cooling. Normal floor space requirements are 20 to 40 per cent less. Efficient use of steam, water, and electricity provides additional savings. And, an Automatic Sequence Control System, developed by Barnes especially for aseptic canning, safeguards against understerilization . . . records, controls, and coordinates every phase of the canning operation for maximum, cost-cutting efficiency.

INVESTIGATE THE PROFIT POSSIBILITIES OF THIS SYSTEM TODAY

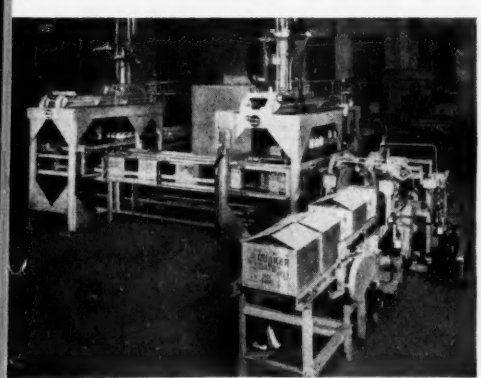
Find out how this unique canning method can help you cut food processing costs . . . improve product quality. Your problems will be given expert and individual attention.

W. F. & John Barnes are Exclusive Sales and Service Representatives for the James Dole Engineering Company

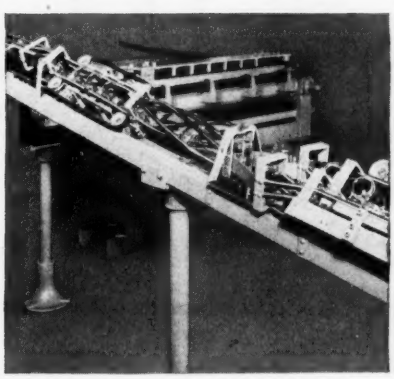
Send **FOR NEW BROCHURE**

Describes in detail the advantages of canning with the Martin System . . . generously illustrated with photographs, charts, specifications, drawings.

SPECIAL EQUIPMENT DESIGNED AND BUILT BY BARNES



CARTON UNCASERS AND RECASERS—Electromagnetic equipment designed and built by Barnes to uncase, unscramble, count, pattern-form, and recase tin containers automatically. Unit shown performs both operations. Individual units available to uncase or recase.



SPECIAL CONVEYORS AND ELEVATORS—A wide variety of conveyors, telescopic elevators, can elevators, inspection line conveyors, etc., designed and built by Barnes, speed processing and reduce work-handling in food and beverage plants.

SEND FOR MORE INFORMATION TODAY!

Complete and detailed information on how Barnes' food processing and handling equipment can help your production problems. Write today for free literature.

W. F. & JOHN BARNES COMPANY

PROCESS EQUIPMENT DIVISION
303 SOUTH WATER STREET • ROCKFORD, ILLINOIS

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Here's another
new lubrication
improvement
from Standard Oil

NEW STANOLITH GREASE WHITE

A new grease! White and clean in appearance, STANOLITH Grease White is the perfect grease for use in food and beverage plants.

Specially recommended for bakeries, breweries, candy factories, canning and cereal plants, chemical processing plants, dairies, distilleries, meat processors — all industries where clean, sanitary operating conditions are at a premium.

● STANOLITH Grease White is a new high quality, multi-purpose lithium soap grease with a clean, white color. It assures you of unmatched lubricating cleanliness *plus* unmatched lubricating efficiency.

In addition to the high-temperature and water resistant properties, characteristic of most lithium greases, STANOLITH Grease White has superior mechanical and chemical stability. It provides a water-resistant lubricating film that gives this remarkable grease extended multi-purpose usage in a wide variety of applications. Easily handled in all usual types of grease-dispensing equipment, it is safe, easy-to-use, clean. Call your nearby Standard Oil lubrication specialist for full details on new STANOLITH Grease White.

STANDARD OIL COMPANY *(Indiana)*

STANDARD

For improved palatability...

TRY SORBITOL

in your food product

IN A VARIETY of foods, sorbitol performs important functions which improve the acceptability of the finished product. A principal use of sorbitol is as a conditioning ingredient to maintain better quality in foods under adverse handling and storage conditions.

Due to its excellent humectant properties, sorbitol has been found to reduce the rate at which confectionery items, for example, become hard or otherwise unpalatable . . . especially in dry, warm atmospheres. Because of this, sorbitol is now required in levels as much as 10% in military specifications for certain confections included in troop rations.

Sorbitol also enables shredded coconut to keep ts original tenderness and flavor for longer periods . . . helps to retain the moistness of cake and cookie toppings and fillings. It improves the uniformity and quality of certain protein whips.

A wholesome, mildly sweet tasting food ingredient, sorbitol occurs naturally in a variety of fruits and berries. It is produced in large quantities by Atlas, by the hydrogenation of corn, beet or cane sugars. It's available in liquid or crystalline form, at economical price. Write or call Atlas today for samples of sorbitol, and for a copy of our new booklet describing the varied uses of sorbitol in foods.

FOOD INDUSTRY DIVISION

ATLAS

CHEMICALS DEPARTMENT
ATLAS POWDER COMPANY
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ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, CANADA

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Aerial view of the Kansas City, Kansas, Works, Fairbanks, Morse & Co., 3601 Kansas Avenue.

...from Kansas City

Yes, from our new, modern-as-tomorrow works at Kansas City, we serve the world's needs for pumps.

As a major supplier of quality pumping equipment, it is particularly suitable that this new Fairbanks-Morse plant be located at an important crossroads of the world ... Kansas City. In this new plant 190,000 square feet of manufacturing space and a complete foundry occupying 150,000 square feet are devoted to bringing better service to our customers all over the world.

Modern manufacturing, development and testing equipment backed by engineering and production skills of highly trained personnel combine to produce products of unmatched quality ... in performance, durability, economy. Fairbanks, Morse & Co., Chicago 5, Illinois.

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a name worth remembering when you want the best

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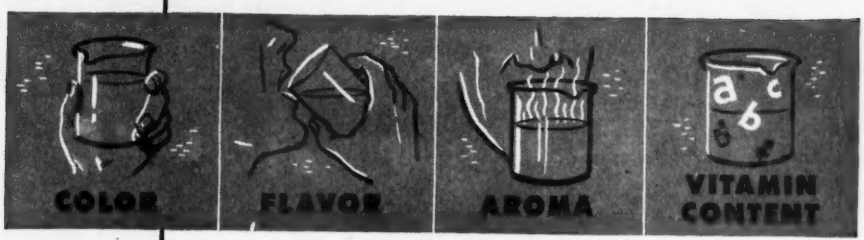
here's how

you can preserve



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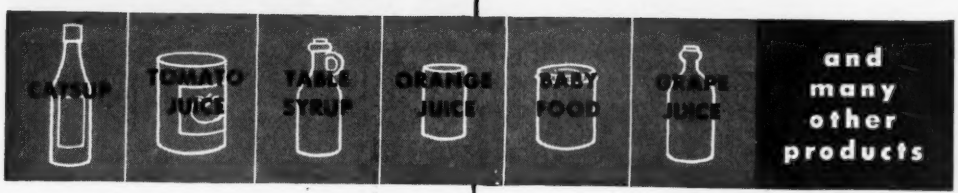

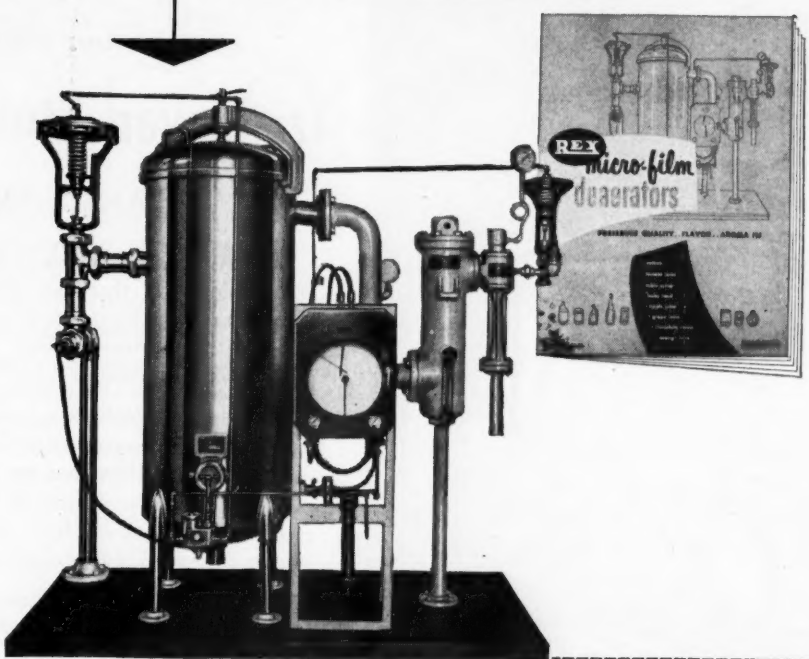

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do the job at very low cost . . . assure you a more attractive, more salable product. Our new booklet, illustrated above, contains the complete story. Use the coupon to send for it today.

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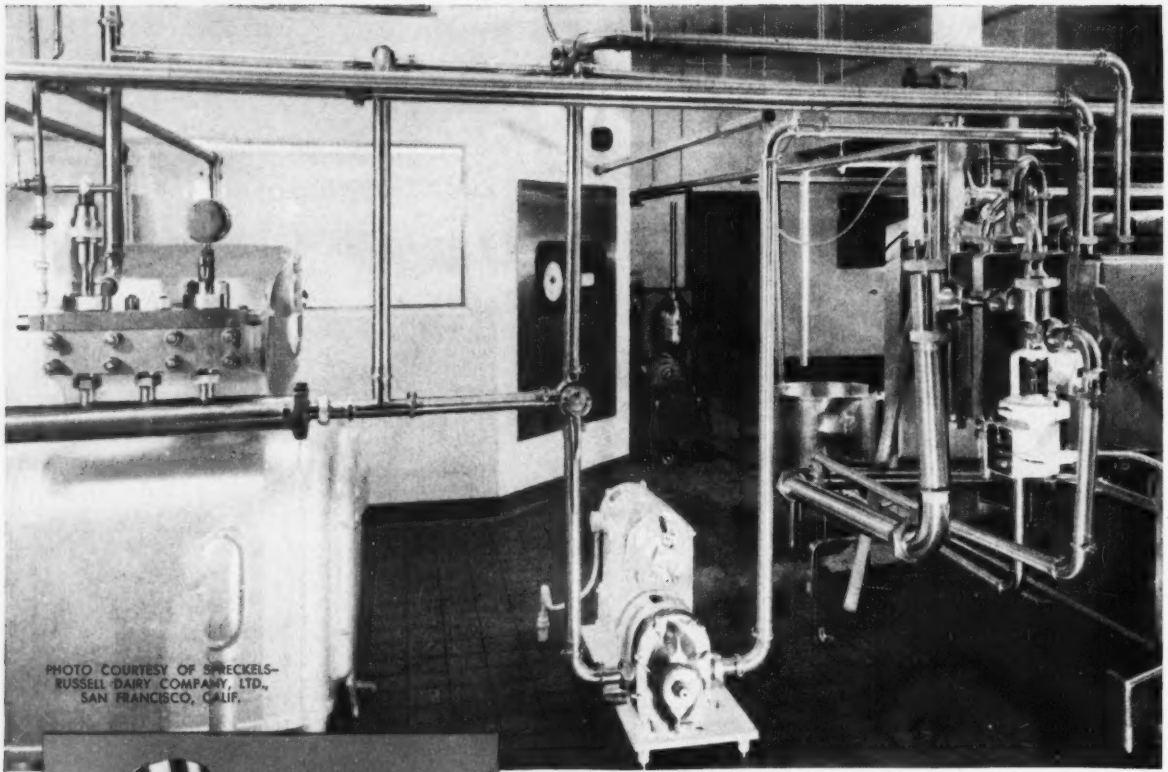

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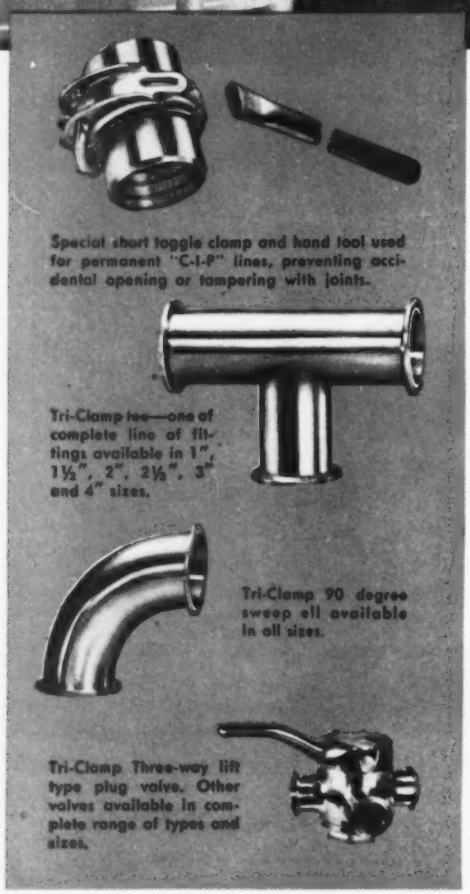


Special short toggle clamp and hand tool used for permanent "C-I-P" lines, preventing accidental opening or tampering with joints.

Tri-Clamp tee—one of complete line of fittings available in 1", 1½", 2", 2½", 3" and 4" sizes.

Tri-Clamp 90 degree sweep ell available in all sizes.

Tri-Clamp Three-way lift type plug valve. Other valves available in complete range of types and sizes.

See your nearest TRI-CLOVER DISTRIBUTOR.
EXPORT DEPARTMENT: 8 So. Michigan Ave., Chicago 3, U.S.A.

. . . another dairy installs

Tri-Clover Stainless Steel

CLEANED-IN-PLACE LINES

. . . this time it's Spreckels-Russell, progressive San Francisco dairy that has recognized the time and money-saving advantages of using TRI-CLAMP Sanitary Stainless Steel Fittings, to provide leak-proof, cleaned-in-place liquid lines.

Here, as in other dairies throughout the country, it was a simple matter to utilize existing sanitary fittings, and to extend lines through the use of simple Tri-Clamp adapters and snap-on clamps. The result is a complete, cleaned-in-place installation, which can be easily and quickly disassembled whenever necessary.

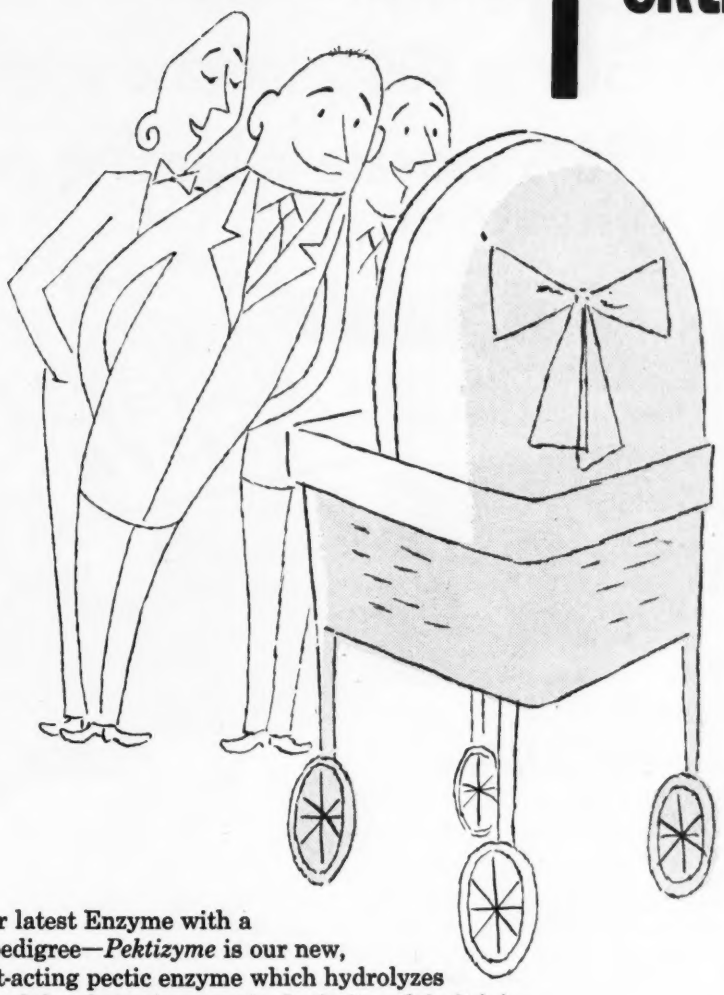
For further details on the complete line of TRI-CLAMP fittings, made only by TRI-CLOVER, write for literature.

LADISH CO.
Tri-Clover Division
KENOSHA WISCONSIN

THE Complete LINE

S254

take a peek at Pektizyme



Our latest Enzyme with a pedigree—*Pektizyme* is our new, fast-acting pectic enzyme which hydrolyzes and depolymerizes pectin. In fruit and fruit juice processing it promotes:

SPEED OF FILTRATION—by destroying the protective action of colloidal pectins and accelerating the precipitation of insoluble materials.

SPEED OF CLARIFICATION—by inducing rapid sedimentation of the insolubles.

REDUCTION OF VISCOSITY—to increase yields by facilitating the pressing of fruits; and to prevent gelation of juice concentrates.

Pektizyme also imparts a *selling personality* to apple and grape juices by giving them the brilliance, clarity and polish that consumers prefer—without affecting the flavor and bouquet of the juice.

Write for full information today.

TAKAMINE

TAKAMINE LABORATORY, INC.

CLIFTON, NEW JERSEY

Other Takamine Enzymes: Various types of starch digesting (amylases) and protein degrading (proteinases) enzymes for use under all conditions of pH and temperature. Also, glucose-oxidase for removal of glucose or oxygen from food, beverage or industrial products.

For more information, use coupon on page 187.

IT WORKS WONDERS IN MATERIALS HANDLING-

300 to 400% increase in efficiency

75% decrease in handling costs

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

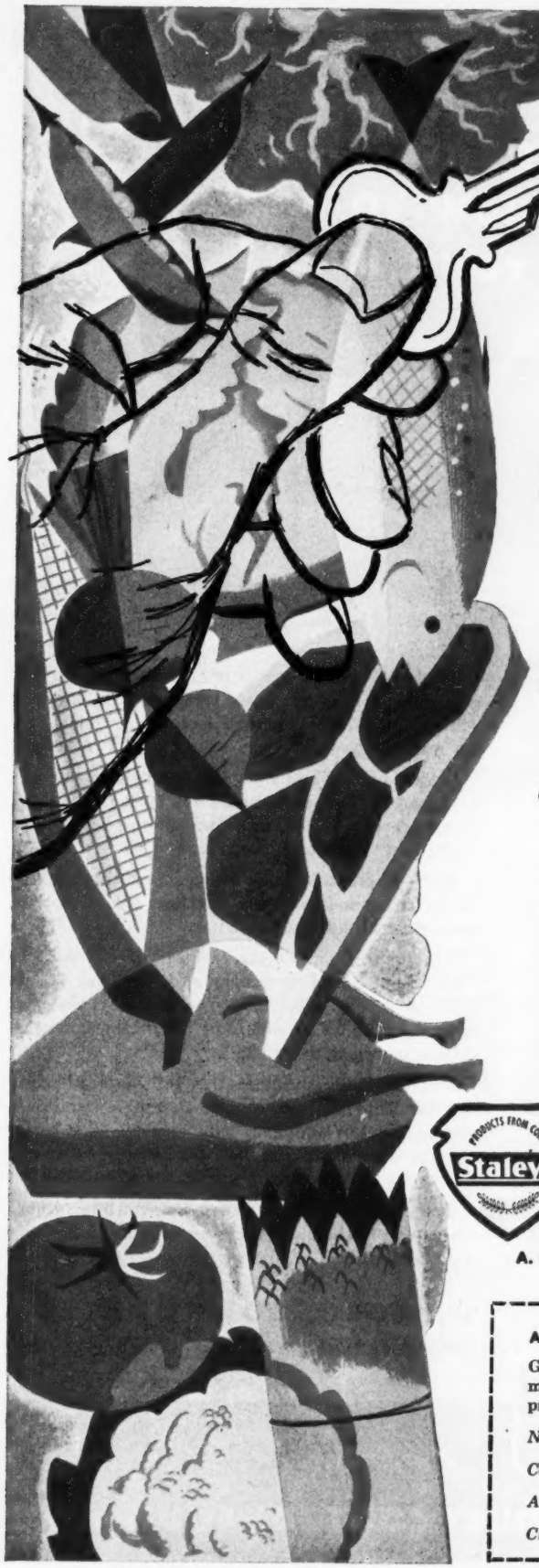
With the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster accomplishes more than several conventional dump trucks. You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised.

It's like having one truck with scores of bodies. One truck-mounted Dempster-Dumpster serves scores of detachable containers built in capacities up to 15 cu. yds. Each is designed to suit the materials to be handled—be they solids, liquids, dust, bulky, light or heavy. You simply place these containers at convenient materials accumulation points outside or inside buildings. As each is loaded, it is picked up, hauled and dumped (or load set down intact). Entire operation is handled by hydraulic controls in cab by only one man, the driver.

The list of manufacturers using the Dempster-Dumpster equipment reads like the "Who's Who Among the Nation's Leading Manufacturers". We mention this simply to point out that dozens of the nation's oldest and most successful firms use the Dempster-Dumpster System because of its efficiency and tremendous savings. Write to us now for complete information. Manufactured exclusively by Dempster Brothers, Inc.

Representatives in principal cities throughout the United States, Canada and foreign countries. There's one near by to serve you promptly.

DEMPSTER BROTHERS, 784 Shea Building, Knoxville 17, Tennessee



Found!

The KEY to Protection Against Flavor Fading!

Amazing ZEST Locks-In Fresh Flavor . . . Your Processed Foods Taste Better . . . Sell Faster!

Yes! Now you can do something to *stop Flavor-Fading* in your processed foods. ZEST, Staley's 99+% Pure Monosodium Glutamate, fortifies and enhances natural, fresh flavors to the point where heat, pressure, or other processing conditions do not rob you of your prime sales appeal—better taste. ZEST adds no flavor, color, or aroma of its own . . . it only brings out and magnifies those desirable flavors already present. Low cost ZEST is easy to use, and requires no formula changes . . . you just add it like salt. And as little as .05% by weight works flavor miracles, the like of which you have never tasted. So stop letting flavor-fading cut into your profits. Mail the coupon below today for the full story on ZEST, and see for yourself how this amazing seasoning can help you to more profits through greater taste appeal.

PRODUCTS FROM CORN
Staley's

Staley's 99+% Pure Monosodium Glutamate

Zest

A. E. STALEY MANUFACTURING COMPANY
Decatur, Illinois

A. E. Staley Mfg. Co., Dept. FE-8, Decatur, Illinois

Gentlemen: Please rush me complete information on ZEST, the miracle seasoning. I want to see for myself how ZEST gives my processed foods a major flavor advantage.

*Name*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

MAIL TODAY

For more information, use coupon on page 187.

■ Modern brewers know that malt must be handled gently. If unloading operations break off the husks, there will be a loss of filter bed material for lauter tubs . . . if the malt is powdered, there will be a loss of extract.

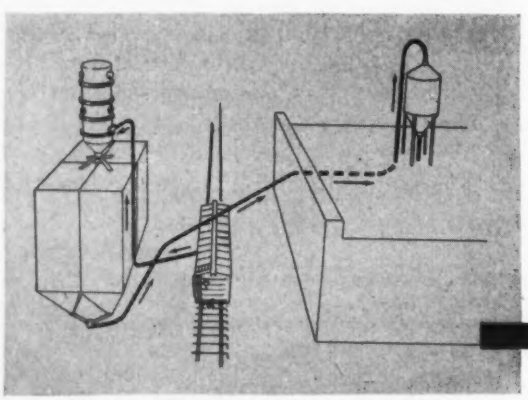
Modern brewers also know that the top-economy way to unload all brewing grains directly from railroad cars to storage bins is by pneumatic conveyor—a Dracco "Airstream" system, for example.

BUT—jet-propelling malt at high speed through conveying pipelines is like throwing eggs against a brick wall—the malt just can't take it.

This was true until Dracco engineers devised a special "Airstream" conveying technique for handling malt as gently as a baby. Since then, breweries have been able to capitalize on the advantages of "Airstream" conveying without damaging their malt.

And look at the advantages they get! Automatic, dust-free handling . . . sanitary, self-cleaning systems . . . savings from less labor and "bulk" buying . . . no loss or contamination of materials—all with Dracco "Airstream" Conveyors for unloading or distributing to process.

Dracco engineers will be glad to show you how "gentle" "Airstream" techniques can make your materials handling more profitable. Why not call in Dracco today?



BREWERY INSTALLATION—Diagram of a recent "Airstream" Conveyor installation at a Milwaukee brewery. System unloads malt and grits from railroad cars, later moves them from storage to process. Top-economy design requires only one vacuum pump and motor!

DRACCO CORPORATION
4085 East 116th Street • Cleveland 5, Ohio

DRACCO *Performance Proved*
Airstream **CONVEYORS • DUST CONTROL EQUIPMENT**

Flour mix shortening can't "bleed" through this paper bag!

The flour mixes that the Chapman & Smith Co. produce for bakers run high in shortening content. This shortening quickly "bleeds" through conventional multi-wall bags . . . results in a serious loss of shortening and stains the outside of the bag.

To solve this difficult packaging problem economically, Chapman & Smith adopted a multi-wall valve bag with a 20-lb. coating of "Alathon" polyethylene resin on the inside ply. In this application, the coating of "Alathon" provides a grease-resistant barrier that keeps the shortening from "bleeding" through the bag, even when exposed to bakery temperatures. In addition, the coating of "Alathon" adds toughness, flexibility and moisture-vapor protection to the bag . . . is chemically inert to the ingredients in the mixes.

Why not investigate the advantages of coatings of Du Pont "Alathon" on paper, film or foil for your packaging needs? "Alathon" stays flexible through a wide range in temperatures—from tropic heat to 100°F. below zero . . . resists most oils, greases, acids and alkalies . . . is readily heat-sealed. For more information, fill in and mail the coupon below.

*REG. U.S. PAT. OFF.

DU PONT
ALATHON
Polyethylene Resin
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Which type of package are you interested in?

- ☐ Multi-wall bags
- ☐ Single-ply bags
- ☐ Pouch bags
- ☐ Board cartons
- ☐ Board trays
- ☐ Fiber drums
- ☐ Corrugated boxes
- ☐ Fiberboard containers

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 548, Du Pont Bldg.
Wilmington 98, Delaware

Please send me information on the properties and advantages of "Alathon" polyethylene resin for the type(s) of packages I have indicated.

*Name*_____

*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

For more information, use coupon on page 187.

Multi-stop leader goes automatic with...

new METRO-*Matic* transmission

METRO-*Matic* in models with METRO® bodies offer many time- and money-saving benefits in food delivery. Available as optional equipment at moderate extra cost. Automatic transmission also available in other INTERNATIONAL light-duty models.

Here is the news multi-stop truck buyers have been waiting for! Here is new economy, efficiency, driving ease, and value added to INTERNATIONAL—the multi-stop delivery leader for 16 straight years!

The new METRO-*Matic* Transmission is what you'd expect from the leader. It is a perfected torque converter type with built-in direct drive combined with an automatic three-speed transmission. It offers every automatic transmission benefit plus the economy of a conventional transmission.

METRO-*Matic* adds further to the many exclusive cost-saving features of famous INTERNATIONAL multi-stop trucks. It provides the effort-saving, engine-saving, fuel-saving advantages of correctly-timed, always smooth automatic shifting—reduces maintenance costs—saves time in traffic and on routes—saves driver energy—makes possible more deliveries per day. Visit your INTERNATIONAL Dealer or Branch and take a demonstration drive with METRO-*Matic*. Your trade-in may cover the down payment. Convenient terms arranged.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

METRO-*Matic*... the Modern Automatic

- **Torque converter coupling** provides smooth power transfer—multiplies torque up to 2.16 to 1 for smooth, fast starts under load.
- **Hydraulically-controlled** planetary transmission shifts automatically through three forward speeds, has constant mesh helical gears for clashless, "bumpless" operation.
- **Converter lock-out** gives 1 to 1 ratio direct-drive high gear operation—reducing slippage and increasing gasoline and oil mileage. Automatic accelerator-controlled downshift restores converter action for quick bursts of speed.
- **Steering column selector** lever permits simple accelerator and brake driving—allows locking of transmission in low gear for heavy pulling or maximum downhill braking.
- **Low and reverse selector** lever positions permit easy "rocking" in mud or snow.
- **Mechanical type governor** in transmission provides always-smooth shifting regardless of temperature changes.

International Harvester Builds **McCormick®** Farm Equipment and **FARMALL®** Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL® TRUCKS

"Standard of the Highway"

For more information, use coupon on page 187.

BACK IN THE 1880's

WHEN THE TIME CLOCK WAS INVENTED

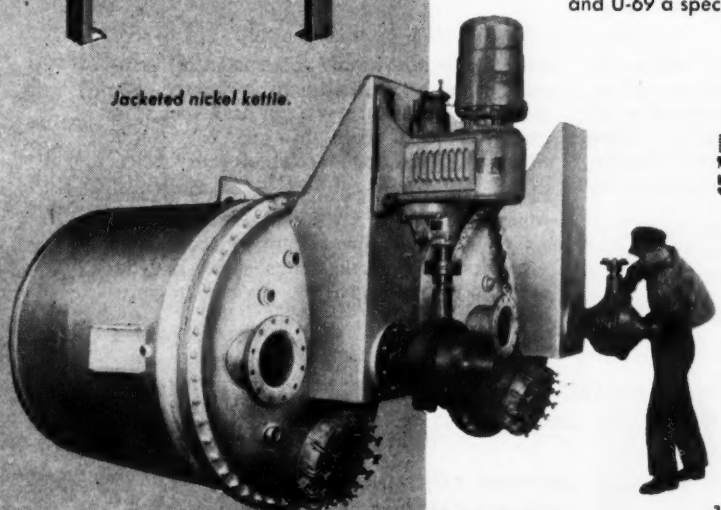
Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

Just as the time clock has eased the problem of record keeping for American industry, so KOVEN has pioneered in solving production problems in key food plants. Through the years, leading food manufacturers have found that KOVEN units—built to their exact needs—are the fastest, most efficient way to peak output at lowered costs. If you have a production problem, one of our trained representatives will be glad to discuss it with you—of course, there is no obligation. Send for Facilities Catalog # 490.

Complete modern facilities including X-ray inspection and stress relieving which insure quality control. KOVEN equipment in all commercial metals and alloys includes: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, breechings, coils. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

Jacketed nickel kettle.

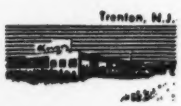


A.S.M.E. Code jacketed tank with bolted cover and drive.

Plants: Jersey City, N.J.

Dover, N. J.

Trenton, N.J.



L. O. KOVEN & BRO., INC.
154-D Ogden Avenue, Jersey City 7, N. J.

KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

For more information, use coupon on page 187.

GAIR can help MERCHANDISE YOUR PRODUCT

with sales-appeal DISPLAY

With Gair display stands working for you in retail outlets, it's like having a company salesman in every store. The mass presentation of your product commands the attention of passing shoppers . . . the constant repetition of your sales message stimulates the urge to buy.

Do you want to introduce a new product? Pep up the sales of a standard item? Push a combination deal? Gair display stands will help.

Designed for long and useful promotional life, these stands are sturdily constructed of corrugated board and are attractively printed. For greatest visual impact, you can have your sales story printed in more than one color on a contrasting background color of your choice.

Check with the Gair plant nearest you to learn which of the many styles will make a perfect setting for your product. Learn, too, how Gair's assured supply source, design ability and delivery service help give you the best in corrugated display aids.

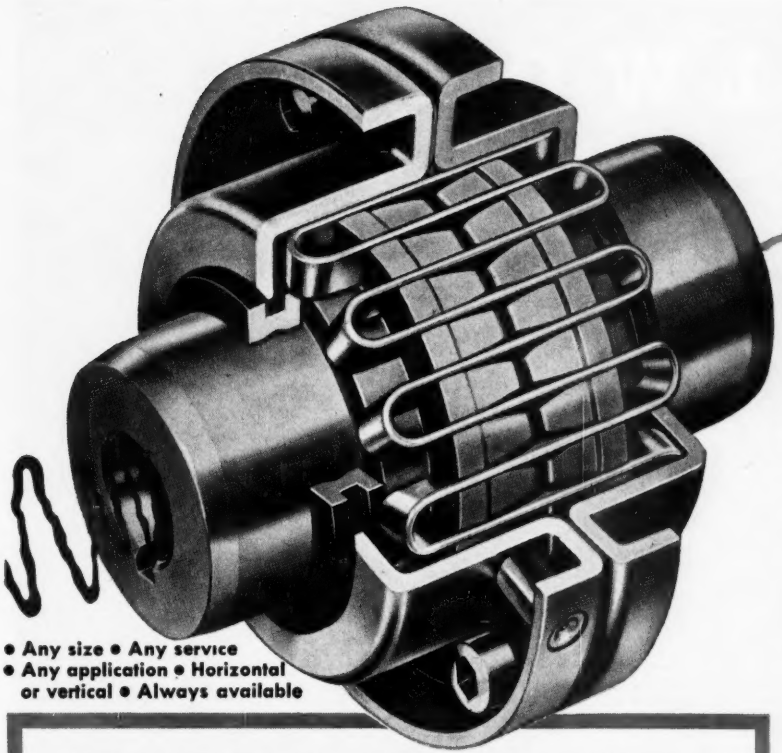
CAMBRIDGE, MASS. • CLEVELAND, OHIO • HOLYOKE, MASS. • LOS ANGELES, CAL. • MARTINSVILLE, VA.
NO. TONAWANDA, N. Y. • PHILADELPHIA, PA. • PORTLAND, CONN. • RICHMOND, VA. • SYRACUSE, N. Y. • TETERBORO, N. J.

GAIR

SHIPPING CONTAINERS
FOLDING CARTONS
PAPERBOARD

ROBERT GAIR COMPANY, INC. • 155 EAST 44th STREET • NEW YORK 17

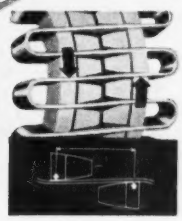
For more information, use coupon on page 187.



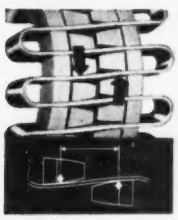
• Any size • Any service
• Any application • Horizontal or vertical • Always available

Exclusive FALK Steelflex grid-groove design smothers shock and vibration.

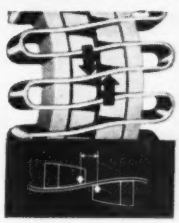
The damaging effects of shock and vibration can shorten the life of any connected machinery. Here is how the Steelflex grid-groove design overcomes these common enemies.



Under LIGHT LOADS
The gridmember bears only at outer edges of grooves. The long span between points of contact remains free to flex under load variations.



Under NORMAL LOADS
As load increases, the distance between supports on the grooves is shortened proportionately, but a free span remains to cushion shock loads.



Under SHOCK LOADS
Under extreme overloads, the grid-member bears fully on the grooves and transmits full load directly. The coupling remains flexible, within its rated capacity.

Why FALK Steelflex Couplings give the *finest* protection for connected machinery

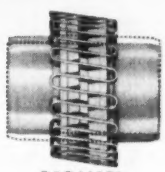
Maximum protection of connected machinery is best provided by Falk Steelflex Couplings because, thanks to their exclusive design, they overcome the damaging conditions of shock loads, shaft misalignment and vibration. How this unique multiple protection is made possible is shown at the right.

Falk Steelflex Couplings give the most economical protection, too, because they make connected machinery last longer and give better service. Furthermore, when actual coupling costs are figured per year of service, Falk Steelflex Couplings show substantial savings through their rugged all-steel construction, easy interchangeability and low maintenance requirements.

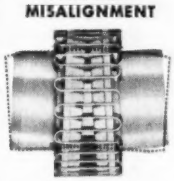
The basic Type F Steelflex Coupling—in 33 sizes to cover capacities from 2/5 through 70,000 hp per 100 rpm—meets over 90% of all industrial applications. Special or Dual Purpose Steelflex Couplings are available for problem applications. Write to Department 247 for engineering bulletin, including selection and dimension details.

...Accommodates shaft misalignment and free end float

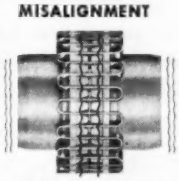
Basic maintenance procedure dictates regular inspection and correction of shaft alignment. Between inspections, Steelflex couplings provide protection by accommodating unavoidable shaft misalignment and end float. The gridmember which connects the two hubs of a Steelflex coupling is not fastened to either hub, so each hub can shift without imposing load on the other shaft.



PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT



FREE END FLOAT

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

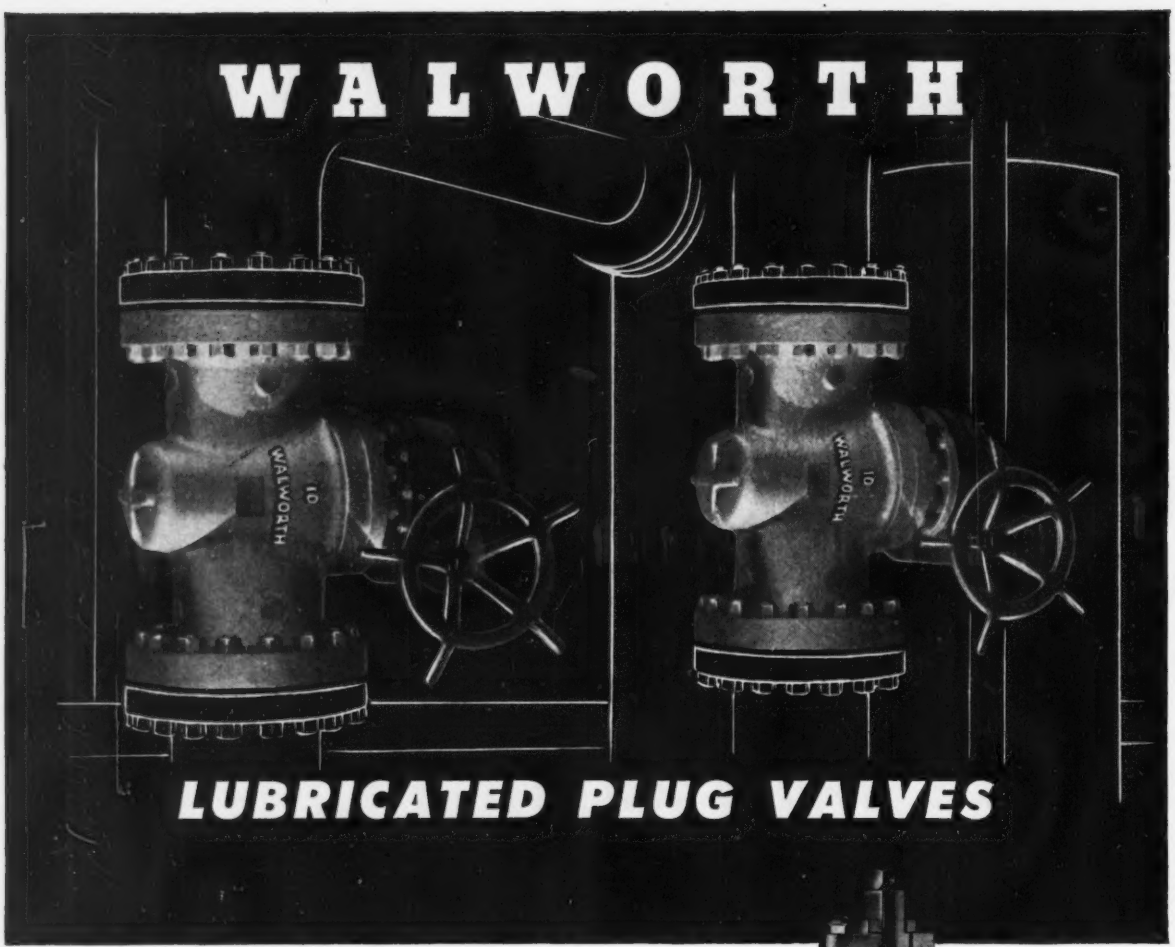
- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

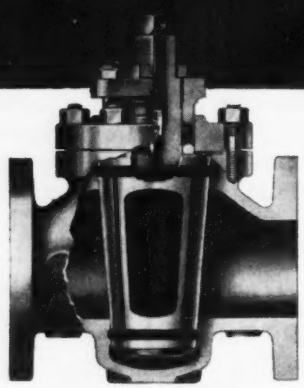
For more information, use coupon on page 187.

WALWORTH



LUBRICATED PLUG VALVES

Better because ... **They are *pressure sealed* with an insoluble lubricant readily renewed while the valve is in service. Lubricant completely surrounds the plug ports assuring a tight seal against leaks. It also insures ease of operation by reducing friction between the body and the plug while at the same time protecting the finished surfaces against corrosion and wear.**



Lubricant system of a Walworth No. 1700F Regular Gland, Wrench Operated, Steel-iron, *Lubricated Plug* Valve. Other Walworth *Lubricated Plug* Valves include Single Gland, and Ball Bearing types. Sizes to 30-inches — pressures to 5,000 psi, and for vacuum service.

Walworth Lubricated Plug Valves are the most satisfactory valves available for the handling of gritty suspensions, and many other destructive, erosive, and corrosive industrial and chemical solutions.

They are ideal for general refinery and pipeline service.

For full information see your Walworth Distributor, or write for your copy of Bulletin 111. Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.

WALWORTH

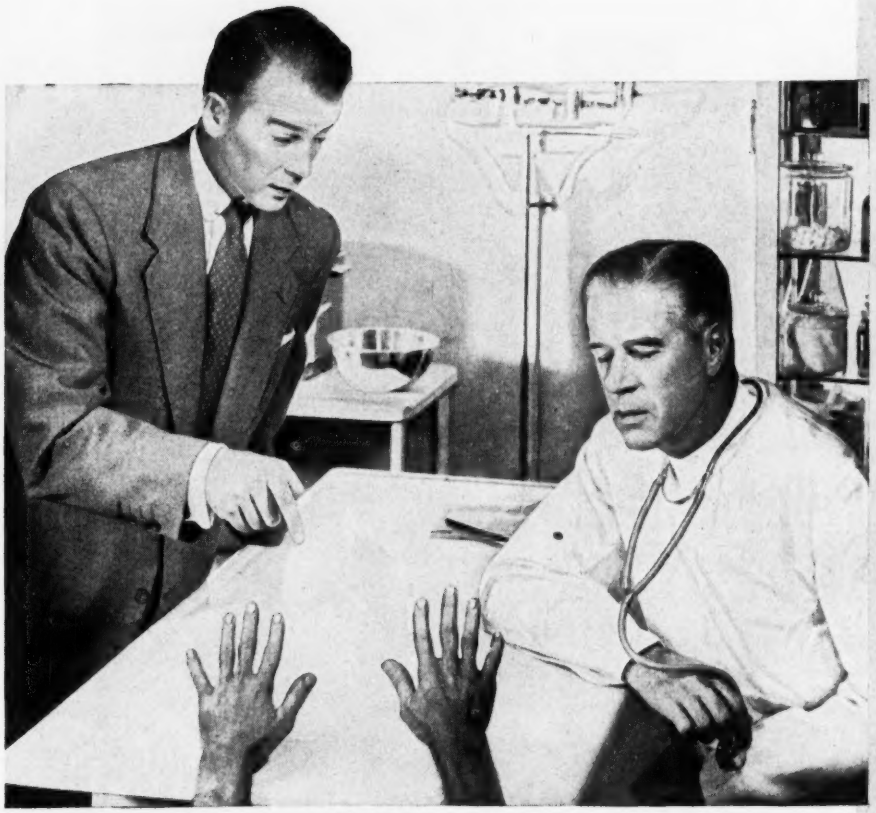
Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For more information, use coupon on page 187.



LET'S START WITH THE CAUSES OF *DERMATITIS*

Costly dermatitis can be prevented. By getting at the basic causes. We can help you by analyzing the work your employees do, checking for hazards our experience tells us might cause dermatitis. We'll check the care given their hands. Then we'll compare your present protective treatments with the skin care methods we've found to be best during our many years of controlling industrial dermatitis.

Where it is necessary, we offer consultation with specialists. Complete chemical and bacteriological analysis.

After these preliminaries we can help you set up a *continuing program* for dermatitis control. Provide leaflets and posters to help educate employees. Assist you in choosing the particular products from West's broad line that will best apply to your situation. At the right are a few examples.

Let's see how WEST products control dermatitis

West's complete line of sanitation products includes hand cleaners, protective creams, antiseptic soaps and protective garments. Everything you need for effective control of dermatitis. Here are a few of them.

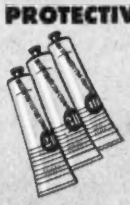
LAN-O-KLEEN

is a heavy duty powdered hand cleaner. Contains a relatively high percentage of "free" lanolin, the emollient lecithin, soap, and balanced alkalis blended together by a secret process in a fine corn meal base. Provides both super-fatting and effective cleaning.

ANTISEPTIC SULPHO HAND CLEANER

contains bacteriostatic properties. Will not defat the skin. Excellent skin cleaner even for sensitive hands. Offers protection against many harsh chemicals and other materials used by people in industry and institutions.

ANTISEPTIC PROTECTIVE CREAMS



contain bacteriostatic properties. Formulated to provide protection against almost every occupational hazard. Used by thousands of workers throughout the United States and in Canada.

WANT DETAILS?

Tear out this coupon and mail with your letterhead

Dept. 8

I'm interested in:

☐ A FREE booklet packed with information on dermatitis and helpful tips on skin care.

☐ A talk with a West specialist about my dermatitis problem. No sales pitch. No obligation. Just discussion, a look at samples, and a demonstration if I want it.

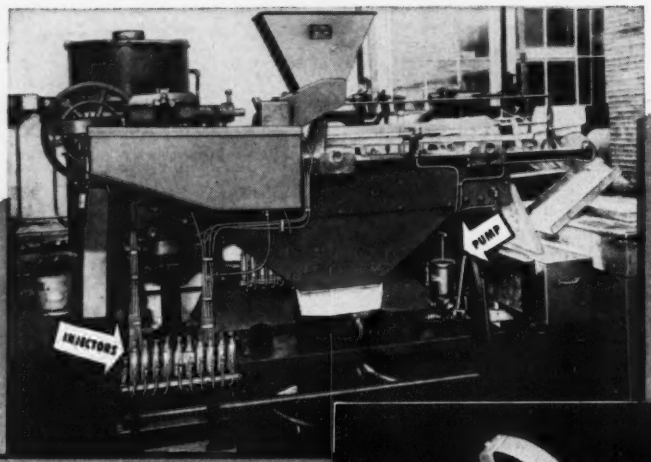
WEST DISINFECTING Company

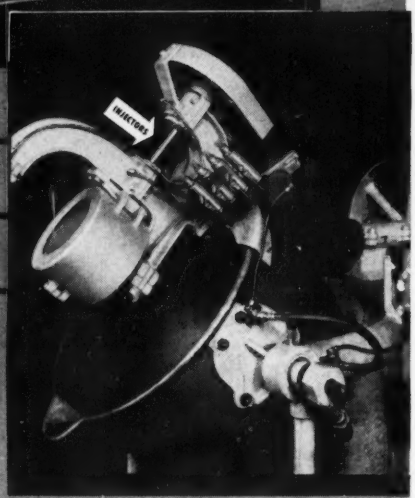
West's broad line of products includes not only cleaners, soaps, and protective creams but also washroom service . . . disinfectants . . . deodorants . . . insecticides . . . floor maintenance materials. West is also the exclusive distributor of Kotex Sanitary Napkins sold through vending machines.

42-16 West Street, Long Island City 1, N. Y.

For more information, use coupon on page 187.

"Increased Output Per Machine..."





• Reduced Lubrication Time 80%

• Saved 30% on Lubricant Costs with

LINCOLN CENTRALIZED LUBRICATION SYSTEMS!"

says: JOHN MAVRAKOS, General Manager
Mavrakos Candy Company
St. Louis, Missouri

"Before installation of the Lincoln System, our machinery had to be manually serviced at regular intervals by a lubrication crew. Now, since installing the Lincoln Systems, we have reduced labor costs 80%, and we use 30% less lubricant.

"We are particularly impressed by the marked increase in out-put per machine, and the *cleanliness* of the system which completely eliminates the possibility of dripping grease contaminating our products.

"We will be most pleased to recommend the Lincoln System to anyone contemplating its use."

John Mavrakos, General Manager
Mavrakos Candy Company
St. Louis, Missouri

Write Today, for your FREE copy of Catalog 80, giving complete information on Lincoln Centralized Lubrication Application Systems.

With Lincoln Centralized Lubrication Systems, tremendous savings are possible . . . down-time for lubrication is eliminated . . . accident hazards are eliminated . . . there's no excessive lubricant to contaminate foods . . . bearing life is increased as much as 1500%.

• • • PIONEER BUILDERS
LINCOLN
LUBRICATING EQUIPMENT • • •

LINCOLN ENGINEERING COMPANY
5781 Natural Bridge Avenue, St. Louis 20, Missouri

Sealva*

THE NEW HERMETICALLY SEALED **FLAVORS**

Success

The unusual success of the remarkable SEALVA* process is attested to by its wide acceptance in almost every branch of the food field. Already SEALVA flavors are being used in commercial production in—

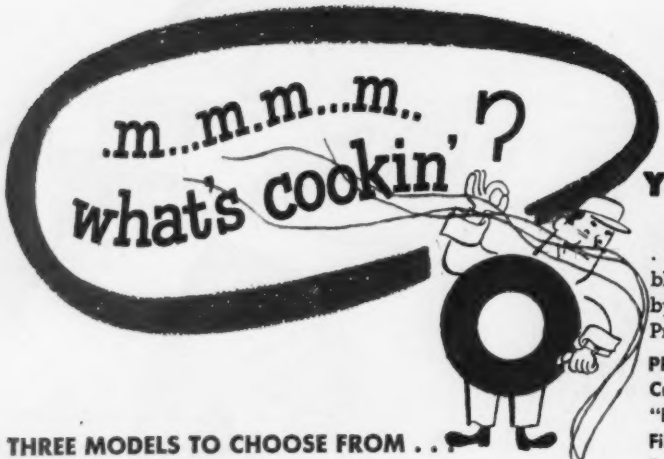
- **Pie Fillings**
- **Cake Mixes**
- **Cake Icing Mixes**
- **Pudding Powders**
- **Gelatin Desserts**
- **Ice Cream & Sherbet Mixes**
- **Confectionery Cream Centers**
- **Pressed Wafers**
- **Chewing Gum**
- **Pharmaceuticals**
- **Summer Drink Powders**

SEALVA flavors can undoubtedly improve the taste and acceptance of your product. Samples and technical data at your request.

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET • NEW YORK 19, N. Y.

Alva FLAVORS

* The SEALVA process is a method whereby minute droplets of flavor oils are sealed against the ravages of atmosphere and shelf-life within an impermeable membrane of edible gum. The flavor contained in this dry powdered form is released instantly in the mouth or in liquids.



ALMOST ANY HEAVY BODIED LIQUID YOU CAN THINK OF

. . . can be heated, cooked, pasteurized, mixed, blended, cooled and held in refrigerated storage by heavy-duty, all-purpose Cherry-Burrell Round Processors.

PRODUCTS NOW BEING PROCESSED INCLUDE:

Cream Cheese
"Fiberglas" Binder
Fillings (cookie and pie)
Frostings
Ice Cream Mix
Icings
Marshmallow
Orange Juice Concentrate
Oils and Fats
Buttermilk
Chocolate Milk
Cream
Evaporated Milk
Market Milk
Skim Milk
Sour Cream
Sweetened Condensed
Superheated Condensed

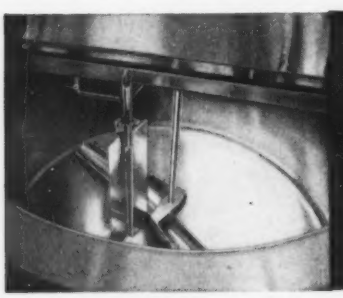
THREE MODELS TO CHOOSE FROM . . . DEPENDING ON YOUR NEEDS

Model "WP": For fast, uniform heating to high temperatures with direct steam vapor or re-circulated hot water through spray rings at both top and bottom of vat. Rapid cooling with well, city, tower or sweet water. Capacity: 200 to 1000 gal.

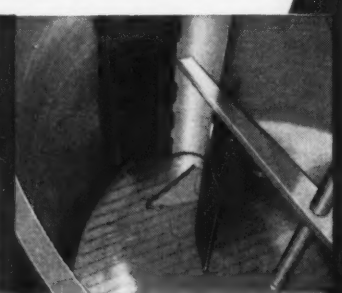
Model "EP": Enclosed waterway pressure channels on sides and bottom assure fast heating with hot water or steam; efficient cooling with well, city or tower water. For low-temperature cooling, Model "EP" uses refrigerated water. Zone control available. Capacity: 200 to 1000 gal.

Model "DP": Only heavy-duty vat available that heats with steam vapor and cools by a combination of recirculated water and direct expansion. A self-contained, direct expansion combination cold wall and pump spray cooler. Best bet for low-temperature cooling where ice bank systems are not available. Capacity: 200 to 1000 gal.

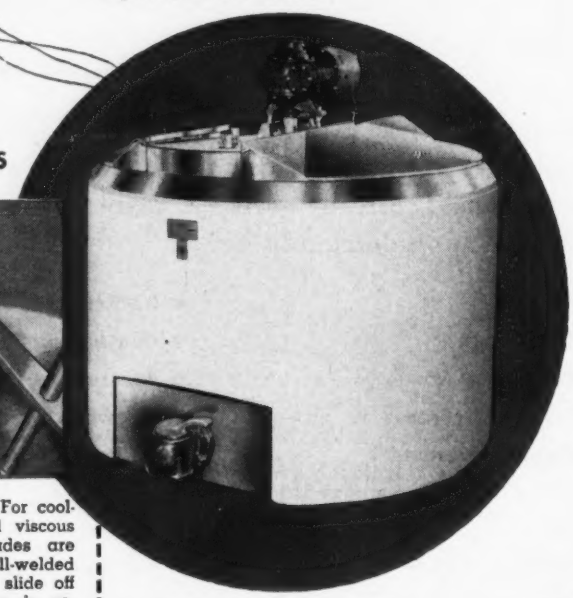
CHOICE OF TWO TYPES OF REMOVABLE AGITATORS



Long Sweep Agitator: High back, stainless steel blades on removable agitator provide thorough mixing and blending. Feathered blade ends keep product from climbing walls, even at high speeds. Adjustable, removable baffle keeps foam at minimum. Two-speed agitator.



Scraper Blade Agitator: For cooling extra heavy bodied and viscous liquid products. Scraper blades are hard plastic, mounted in an all-welded stainless steel frame. Blades slide off for cleaning. Entire agitator is removable.



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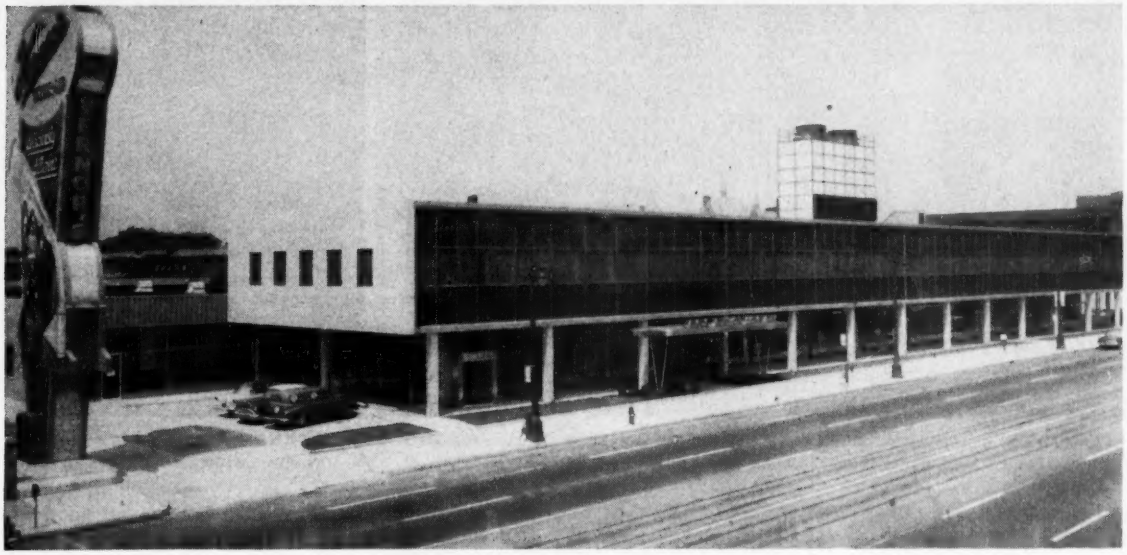


FUNCTIONAL "On-View" layout is featured in modern block-square building. Front is of yellow porcelain enamel and colored tempered glass with tinted vision strip set in stainless steel frames. Exterior walls are glass.

Plant That's "Long" on Engineering

"Show-Cases" Its Process

New Detroit facility combines pallets, conveyors, and automated units to get top efficiency in high-volume operation. Modern design employs full-front window that visualizes ginger ale production to the public

First of Two Articles

J. N. SUTTON and ARTHUR V. GEMMILL
Respectively, Production and Traffic Superintendent, James Vernor Co., and Senior Associate Editor, "Food Engineering"

From the standpoint of engineering achievement and economy of operation, the new $5,000,000 plant of James Vernor Co., Detroit, is outstanding in the soft drink field.

Completely palletized, the operation embodies latest automatic bottling and handling equipment, controls and layout, including a number of firsts in the field.

Most noteworthy is use of automatic palletizers in conjunction with fork-lift trucks for complete elimination of manual handling in truck loading and unloading. By this method, time to load and unload delivery trucks and transports has been greatly reduced.

Maximum use of conveyors and automatic uncasers has reduced from six to one the times cases of empties are handled manually.

Supplies such as bags of sugar, cases of crowns and bottles, drums of caustic, and advertising materials are palletized on arrival and stored in convenieint areas.

The building itself is functional, providing for complete manufacture of ginger ale from making of the extract to bottling of finished beverage, plus full storage space along with loading facilities for more than 200 vehicles—all under the one 7½-acre roof.

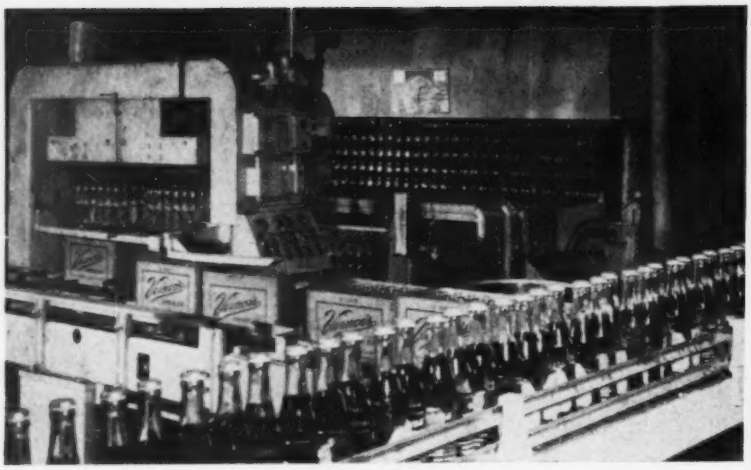
When, in 1951, the city of Detroit embarked on a municipal center program fronting on the Detroit River, the 10-story Vernor plant at 239 Woodward Ave. was marked for demolition.

Fortunately, the company was able to obtain a block-square area at 4501 Woodward. This area circumscribed the original Detroit Convention Hall. Conversion of the building to the present ultra-modern, 2-story fireproof manufacturing and bottling plant was a monumental task taking more than two years.

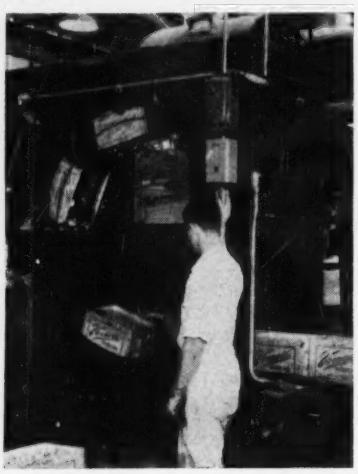
The Woodward Ave. frontage is of yellow porcelain enamel and colored, tempered glass with tinted vision strip, set in a stainless steel frame. First floor is fully glazed to show all extract making, water treating, and bottling operations to the public.

Building walls are of light panel

From "Conveying-In" to "Rolling-Out"



1 **FULL-DEPTH** uncaser automatically lifts empty bottles from several cases simultaneously, feeds them to magazine of large washer.



2 **CLEANER** inverts cases to remove foreign materials.

construction with glass exterior backed with Foamglas insulation and carried in stainless steel frames.

Offices are fully air conditioned as are the syrup storage and jug rooms. Fluorescent lighting is used throughout offices and manufacturing areas.

First floor of the building contains complete ginger ale making and bottling facilities. It is observed that the company is unique in that it bottles only ginger ale and makes the ginger extract on the premises. Also on the first floor are truck storage and loading areas and raw material and supplies storage. And further, this floor features a modern fountain, continuing a practice characteristic of Vernors during its entire 88 yr. existence.

Second floor is devoted to offices, with the exception of a crown storage room that enables gravity feed directly to the fillers.

Blending Distinctive Flavor

Manufacture and processing of Vernor's ginger ale begins in the extract department. Equipment used here is made of stainless steel throughout. Percolators are employed to extract essential ginger oils from imported ginger roots. Extract from the percolators is accumulated in 300-gal. tanks, then blended with other essential oils in 600-gal. processing tanks. It is these oils that give Vernor's its distinctive aroma and flavor.

After processing is completed, the extract is filled into selected, number and dated oak barrels, and allowed to age and mellow at least four years in one of the aging cellars. For use in making syrup for bottling, extract is removed from barrels and blended in one of the two large blending tanks in the extract department. It is pumped from here to the syrup storage room, where an automatic measuring device adds a predetermined amount to each batch of cooled syrup.

Automatic Bottling Lines

The four filling lines—two for 8-oz., two for 24 oz.—have a capacity exceeding 1,000 bottles per min. Provision also is made for filling 1-gal. jugs with flavored syrup at the rate of 24 per min., and tanks of carbonated beverage for fountain use.

Each of the bottling lines is completely automatic, comprising a full-depth uncaser, case cleaner, case packer, automatic magazine washer feed table, Hydro-jet washer, clean-

FOR GRAPHIC isometric flowsheet and detailed list of equipment in Vernor's model bottling plant, see pages 118-121.

bottle inspection assembly, combined filler and crowner, spinner type mixer, full-bottle inspection lights, Freon compressor, water cooler, and carbonator.

Washers in the two 8-oz. lines are 32 wide (320 bpm.); those in the 24-oz. qt. lines are 20 wide (160 bpm.). These machines have six compartments for a dormant soak combined with a hydro-section that sprays caustic solution into the bottles at 22 psi. Final rinse is filtered-sterilized water from the treating system.

Eight-ounce lines have double clean-bottle and full-bottle inspection units. Latter are preceded by a rotary filer that divides the 320 bpm. conveyor line, sending half to each inspection station. There follows a 328-bpm. combiner that brings the lines together. Single line then goes to case packer. Two water coolers are used on 24-oz. line.

The automatic, full-depth uncasers are the first of this type to be used by a soft drink bottler. They feature gentle bottle handling through pneumatically operated transfer plate, and gripper heads with flexibility for picking up off-center bottles.

In operation, cases of empty bottles are automatically positioned on transfer table opposite gripper heads. Table then moves them under the heads which lower, grip bottles, and lift them from the cases. Transfer table retracts, removing empty cases as gripper heads are lowered and deposit bottles on receiving plates. Empty cases are conveyed to cleaner as fulls take positions opposite gripper heads. As these cases move under the heads, transfer table pushes the previously uncased bottles off receiving plate and onto active conveyor feeding washer. Uncaser cycles 7 or 8 times per min.

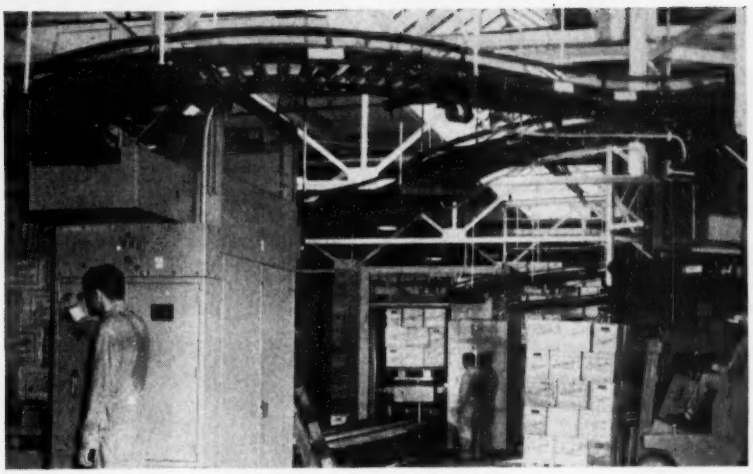
The 8-oz. lines use new type 50-spout combined fillers and crowners employing air lifts to position bottles under filling spouts. They will handle up to 340 bottles per min.

Filling Operations Detailed

In operation of the filling lines, returned bottles are automatically removed from cases and fed to washers. As they are discharged from washers, clean bottles move past two inspectors to filler-crowners, then go to the mixers.

Filled bottles then are conveyed to the packaging room, where they pass the full-bottle inspection lights and

3 **AUTOMATIC CASER** assembles and packs filled bottles.



4 **PALLETIZERS** receive filled cases from overhead conveyors, automatically stack them on 4-way pallets. Fork trucks take them away.

move on to automatic case packers. Here, they are packed in empty cases that have passed through the case cleaners following unloading at washer feed. Then they are conveyed to the shipping room.

Cases Palletized Automatically

Materials handling throughout the plant has been completely palletized. This includes cases for city delivery and highway equipment for delivery to branches, and practically all incoming supplies.

Palletized handling system for case goods comprises: A combination of belt, live roller, and gravity conveyors; three automatic palletizers; six 2,000-lb. electric fork trucks; and 32x42-in. 4-way entry pallets that hold 48 cases of 8-oz. bottles or 40 cases of the 24-oz. size.

Selection of the 32x42-in. pallet was based on its accommodation of all of the merchandise to be handled. It fits long-wise into the compartment of city delivery trucks, and width-wise in the branch trucks.

Shipping department is divided into two zones. Pallet loads of cases of empty bottles are moved to Zone A. Here, they are loaded on two conveyors that run to each of the 8-oz. bottling lines and two that run to the 24-oz. lines. All of the conveyors are situated so that mixed pallet loads can be handled without moving the pallets.

Cases Separated Electronically

As they leave the packers, filled cases are elevated on belt conveyors and move along the ceiling to Zone B. Here, the two 8-oz. lines converge, as

5 **LOADED PALLETS** go directly on city delivery trucks, or large transports for distributing branches, or are stored in warehousing area.

do also the 24-oz. ones. Lines then enter case dividers, which automatically count and dispatch them to two off-bearing lines.

Case dividers are electronically controlled. However, the count for either of the two receiving lines can be changed as desired by properly setting the readily available controls.

Pallet Loaders Controlled

One line from the 24-oz. case divider goes directly to automatic palletizer No. 1, which stacks only cases of bottles of this size. The other feeds a combination 8- and 24-oz. line terminating in palletizer No. 3, located in the truck loading areas.

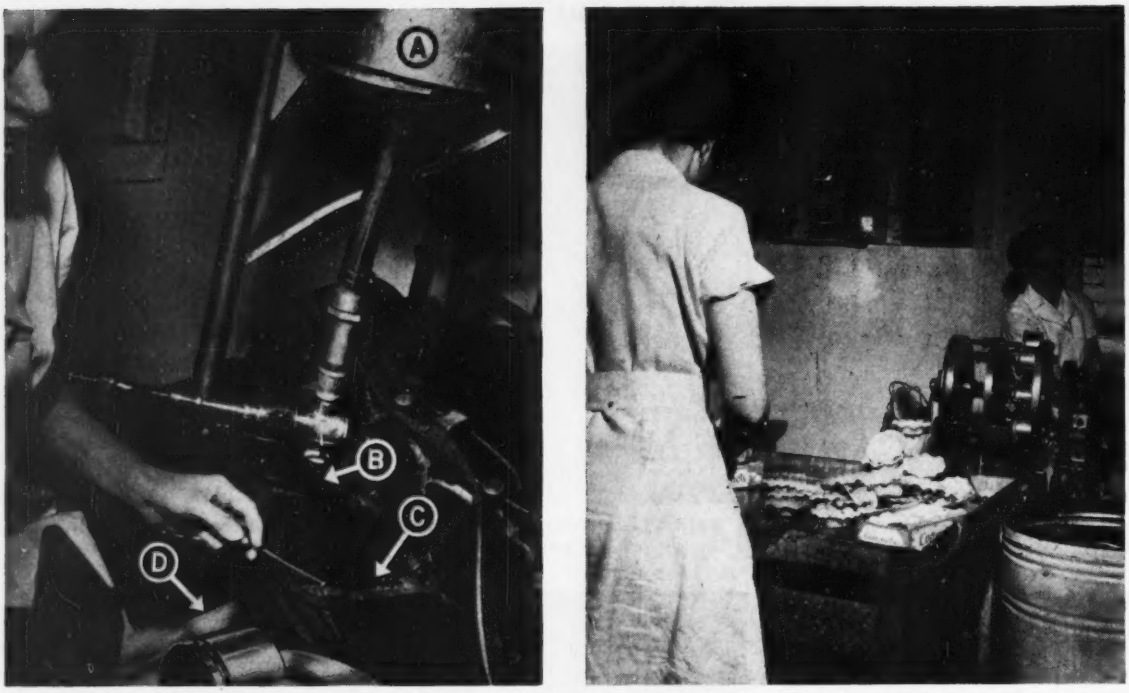
Divider on the 8-oz. line feeds one conveyor that terminates in palletizer No. 2 (which stacks only small bottles) and, also, the combination line to No. 3.

By this method, supply of cases to the pallet loaders is under complete automatic control, preset in accordance with requirements.

Filled cases enter palletizers at rate of 25 per min. and are stacked on pallets automatically. Loaded pallets are discharged to a conveyor, where they are picked up by fork trucks.

Magazine of palletizer holds seven empty pallets. To keep this filled, a fork truck operator performs approximately the following cycle: (1) Moves pallet of filled cases from palletizer to warehouse or places it on a truck, (2) takes pallet of empty bottles to case conveyor, (3) picks up empty pallets, and (4) puts empties in palletizer magazine.

Vernor's advanced practices in preparing its ginger ale syrup will be detailed in a concluding article to appear in September FE.



MODIFIED CONE MACHINE in action. Batter from supply tank (A) is measured volumetrically onto baking-plate (B) as operator with pick (C) moves to take baked flat cake from oncoming plate. Cake will be put in cup press (D). Right: Ejected from cup press, dessert cups are belt-conveyed to table for handpacking into cartons.

New Edible Dessert Cups Baked Flat, Die-Formed

FE STAFF

At 27 a minute, edible dessert cups, made of the same batter as "cake" ice cream cones, are produced by Sugar-Crisp Cone Co. of Seattle under a unique process developed by Tasker B. Roop, company owner.

These cups have found their greatest popularity in the serving of ice cream, custards, and other such desserts.

The batter is mixed in batches containing 70 lb. of dry ingredients, then fed into a 4-gal. stainless steel supply tank mounted above a modified cone-baking machine. This unit is adapted to bake the flat cakes that later are formed into dessert cups. A batch is sufficient to operate the machine for about 2 hr.

The baking machine comprises 36 double baking-plates, quite similar to a conventional waffle iron in construction. Hinged at the back, these plates are fixed, by bearings at either end, to a 6-ft. gear ring. The upper plate is equipped with a roller bearing which, when engaged in a track, is automatically opened to permit the operator to remove a baked flat-cake and, also, for the filling machine to deposit batter in it before it is again closed. The gear ring, driven by a ¾-hp. motor, turns at 1¼ rpm.

In operation, the plates are heated to a temperature of about 600 deg. F. by gas from a high pressure line, with five jet units evenly spaced under the revolving plates. A rising track automatically lifts the upper plates as the gear ring revolves and the operator removes the baked flat cakes with a metal pick.

The empty plate then moves under the filler, is charged with the proper amount of batter, and the upper plate then is automatically closed. Next, the baking plates move into a metal tunnel and, at a point about one-half of a full revolution, they are turned completely over by a special mechanism so the cakes may be uniformly baked on both sides.

From the supply tank, batter flows through a 1-in. hose to a plunger-type volumetric filler that measures the desired amount for each cake and drops it upon the baking plate.

Although thoroughly baked, these flat cakes are still malleable while hot. Only when completely cooled do they become brittle in texture.

After removal from the baking plate, the flat cake is inserted by the operator into a metal trough. It is positioned properly for the forming plate of the cup press. This press, designed and built in this plant, has eight, aluminum forming cups mounted upon a circular, revolving frame.

Flat cakes are pressed into these cups by a cam-operated plunger and held in this form for 16 sec. under 7-lb. spring tension. As the unit turns and a cup reaches the bottom of the press, the tension is released, the plunger exits from the cups, and the finished dessert cup drops upon a conveyor leading to the packing table.

Packing Details

Cups for institutional trade are packed 288 to a cardboard carton or 341 to a 50-lb.-size can. When intended for retail stores, they are packaged eight to a cellophane-overwrapped box bearing the trade name "Coronets." These boxes are packed 24 to a shipping carton.

9 Factors to Point Up in Your PLANT MAINTENANCE

★ Organization
★ Lubrication
Budgets
★ Scheduling
★ Utilities
★ Corrosives
★ Reports
★ Buildings
★ Sanitation

J. S. HUTCHINSON
Chief Engineer, Exchange Lemon Products Co., Corona, Calif.

With a plant comprising 34 buildings–23 at Corona and 11 at Covina, Calif.–maintenance is a constant problem with us at Exchange Lemon Products Co. We believe a good job is being done. Yet we are ever alert for improvements.

Today's trend toward higher speeds, greater capacities, more production, less down-time, and lower costs places added strain on men and machines, with attendant emphasis on good maintenance, careful planning, and better materials of construction.

To stay abreast, here's how we are organized to operate our maintenance:

1.–ORGANIZATION First

F. P. McCormack, plant engineer, is in charge of this department, reporting to the chief engineer at executive staff level. An assistant plant engineer, a chief clerk, a secretary, and one record clerk constitute his office personnel. There are 63 employees on general maintenance work in addition to 26 doing mill-wright and construction work and 21 operators of utility and service facilities in the plant.

Work in the following shops is directed by foremen, each of whom has an assistant: Machine and tin, pipe, electric, carpenter, mill-wright, and paint. In addition, the plant engineer supervises work relative to the boiler house, water supply, electric power, air distribution, waste disposal, and refrigeration operations.

2.–SCHEDULING Is Key

Our plant, has only one area which warrants mechanics of its own. Equipment in the juice products building is rather specialized, so we have a mechanic in charge and two-shift mechanics on each shift. These men have been factory-trained in repairing can-sealing machines. All ordinary maintenance is handled by these men. However, all shop personnel are subject to call by the juice-department mechanics in case of a major job.

Inspection of machinery in the rest of the plant is carried out by three shift mechanics, one on each shift. A mill-wright inspects every conveyor in the plant daily. Two oilers on the day shift also inspect all equipment as they make their rounds, going from roof to basement of most buildings.

Findings are reported to the plant engineer on a form stating equipment inspected, condition, and mechanic's recommendation. More serious conditions are discussed with the assistant plant engineer, and one man inspects the equipment. If at all possible, repair work is deferred until a shut-down can be scheduled to coincide with light fruit receipts. Infrequently, an immediate shut-down may be justified, in which case there's a conference with the operating department foreman and arrangements made.

George J. Martin, manager, Mechanical Div., National Biscuit Co., New York City, states, "Where planning and scheduling procedures have been installed, we have found that 80 to 90% of all maintenance work can be properly planned and scheduled." And we have found this true in our plant.

Problem of laying-by equipment hardly exists here, since lemons ripen and are delivered to our plant the year 'round. Therefore, planning for major repairs is quite difficult.

3.–REPORTS Tell Story

All repair work is reported on a form covering all pertinent data and including space for suggestions or instructions for future repairs. Signed by the mechanic, this form must be initialled by his foreman, to make sure he is acquainted with the repair. Then it is routed to the plant engineer. Another form shows changes, such as speeds, sizes, etc., as well as a description of new equipment installed or items removed.

Numerous changes or additions were made to the can fillers during the past two years, smoothing their operations. Can sealers were recently purchased outright in lieu of yearly leases, and we intend to set up a separate shop for their complete and precise overhaul, which is required after closing 75,000,000 to 100,000,000 cans.

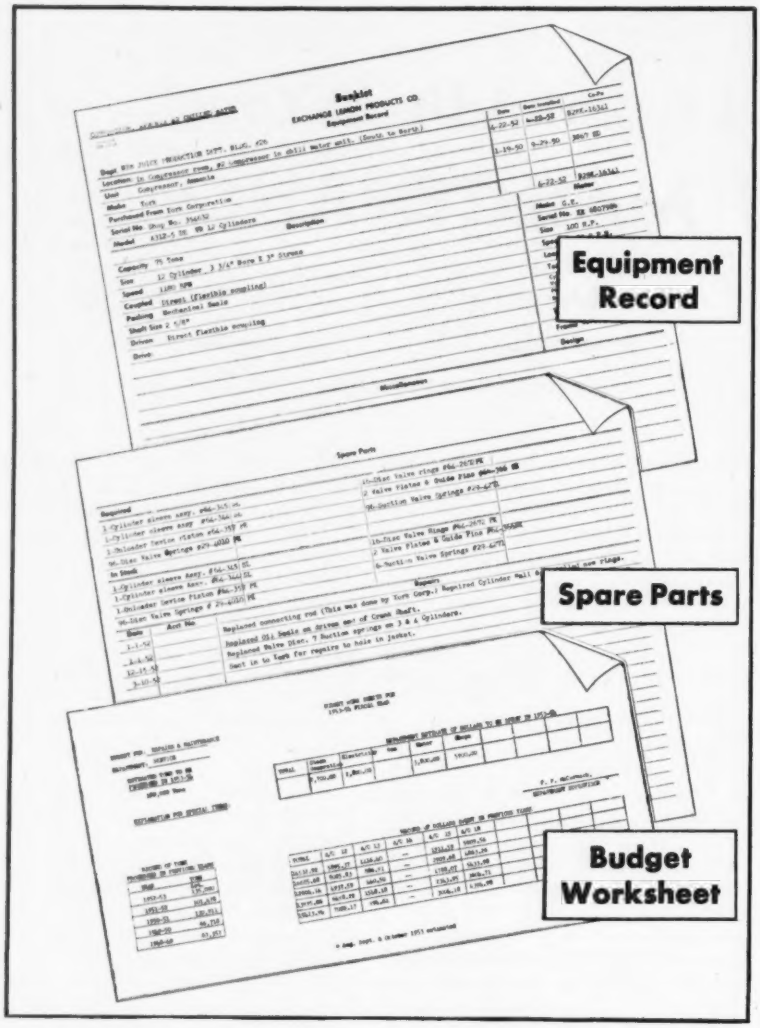
If equipment is well designed and carefully selected for its task, also periodically inspected and properly serviced, maintenance will be cut to a minimum. If repeated failures occur, or frequent overhauls are needed, look for the cause among the following: Overloading, improper materials of construction, inadequate or wrong type of lubrication, improper operating procedure, or inappropriate location.

On all new equipment, request the vendor's instruction manuals, operating instructions, lubrication recommendations, and list of suggested spare parts to carry in stock.

4.–LUBRICATION Centralized

In a food plant, proper precautions must be taken to prevent contamination of the product. At Elpco we feel that a major step in that direction was taken when, early in 1952, we installed 13 centralized lubricating systems. These were located on the two lemon washers and various lemon conveyors and elevators. There are as many as 150 bearings on some of the installations, wherein bearings range from $\frac{3}{8}$ to $1\frac{1}{8}$ in. dia.

This system keeps oilers off the equipment, and since we use oil instead of grease, bearings remain cleaner and there is no waste. Incidentally, one man, in 1 hr., lubes well over 2,000 bearings with this system. With individual grease fittings it



would require 4 man-hours, and our tight operating schedule does not permit of more than one such period for this service.

The −40 deg. F. temperature in the freezer tunnel creates a difficult lubricating problem. But, by using all-purpose grease, sub-zero type, mixed with an additive in the proportion of 2 oz. per lb. of grease, we have not had one failure. All bearings in the tunnel are thoroughly cleaned, flushed, and repacked once a year.

Due to rigid sanitation requirements, the lubrication cycle is more frequent, because of in-plant chlorination and the use of steam and detergents in the cleaning operations.

Where actual contact may exist between juice products and a lubricant, a white petroleum grease is used. A specific packing Garlock No. 740 Lattice-Braid Flax is used with paraffin lubricant in agitator stuffing boxes of mixing tanks. A lubrication chart is maintained in the plant engineer's office showing the type of oil and grease used in all bearings, listed by machines, by building, and by type of bearing.

All oiling is done on the day shift by two oilers. All motors are lubed by an electrician. Years ago, wood rollers for belt conveyors were used and the bearing was either oak or lignum vitae, requiring no lubrication. Many of these are still in use today. Now, in new installations, we use stainless steel rolls and brass bearings.

5.–UTILITIES Teamed

For many years the state and insurance-company inspectors have highly complimented the mechanical department for the condition in which our boilers are maintained. The six boilers, with 1,175 h.p., can easily handle all normal loads, amounting to about 60,000 lb. per hr.

In addition to the usual daily routine operations (such as soot blowing, feed water and make-up water testing, checking oil burners, instruments, etc.), each boiler, furnace, and auxiliary is thoroughly inspected every 4,000 hr. of operation. This includes repairs to fire boxes, tube cleaning inside and out, also inspection of all valves, traps, and drums.

All repairs are reported on a form, giving type of repair, time required and labor, as well as the time the boiler went off the line and the time it is ready for steaming again.

All electric power is purchased, the California Electric Power Co. supplying a total transformer capacity of 3,900 Kva., 34.5 Kv to 4,160v. feeding our outdoor metal-clad switchgear. We have 8-unit substations, the largest of which is 1,500 Kva., serving the heavy refrigeration load. Power is distributed to individual motors through 25 control centers. In addition to the usual application of electric power (such as to motors, level control, safety alarms, and signal lights), we start and stop our can lines by means of balance beams. The weight of the cans actuate switches (Mercoid).

Two balance beams are used at each location, separated by several feet to prevent short cycling of the control system.

An unusual safety measure was taken recently on the 8-ft.-wide hydraulic bridge connecting docks of the juice products building and a new sub-zero storage warehouse. A double spur track crosses this bridge, and it lowers to ground level for switching refrigerated cars. There is a derail on the track ahead of the bridge, and the Public Utilities Commission required an electric interlock such that (1) the derail could not be thrown off the track unless the bridge was in its lowered position and the control box closed and locked, and (2) so long as the derail remained off the track, the bridge controls could not be operated.

The control circuit had to be 10v. d.c. We worked this one out correctly with the help of the Santa Fe signal department and threw in, for good measure, the automatic operation of two hinged wheel stops that swing onto the rails when the bridge goes up. This, we hope, will stop a car from hitting this expensive bridge, should a car get out of control.

Fire Fighting Equipment

We enjoy a very good insurance rate, because most of our buildings are equipped with automatic sprinklers. We do our own inspecting and testing of this equipment. In fact, we have designed and installed some of the building sprinkler systems, adhering to the rigid regulations laid down in the NBFU *Red Book*. Our plant fire chief spends 4 hr. a week inspecting all our fire equipment.

Water for our boilers is from the

Corona City supply, because it is normally low in mineral hardness. Two wells on our property furnish water for processing. Six cooling towers serve the many condensers and heat exchangers in the plant. They range from an old atmospheric unit to the latest type induced draft tower.

Air is furnished all buildings at 35 psi. for various uses. Instrument air is supplied by small compressors where needed and is dried by silica gel in equipment of our own design and make. Air is used to operate the heavy insulated sliding doors in the refrigerated warehouse. In this application, if the slightest amount of moisture remains in the air, it will frost up the lines, making the doors inoperative. Considerable maintenance has been required at this station.

6.–BUILDINGS Basic

Inspections are made monthly of all building roofs, windows, gutters, floors, and painting. Roofs either are of composition or corrugated asbestos. Gutters and downspouts formerly were of copper, but better fume control now permits use of galvanized iron, so saving money in upkeep. We have 36,000 sq. ft. of floor covered with 1¼-in.-thick mastic. This was put on hot. It has proved quite satisfactory for many years.

With these floors, of course, we must make sure that acid or juice is kept from getting to the concrete below. So constant attention is required, since the mastic will not support heavy loads and, therefore, equipment legs must penetrate it in order to rest on concrete.

In recent years, we have installed quarry tile floors with specialized cement joints in two of our juice processing buildings. These floors are by far the best in the plant, and though costly to install, are easily kept clean and always look immaculate.

7.–BUDGETS Eagle-Eyed

Some 30 days prior to the closing of our fiscal year, budget work sheets are furnished all department supervisors. These indicate the tons of fruit processed yearly, and the cost of repair and maintenance (designated "R & M") during the previous five years. The expected fruit receipts for the ensuing year are shown, and space for the estimated cost of R. & M. is also provided.

I hasten to state that gaging the future is difficult for us, weather being what it is, even in California. Last October, the estimate for this fiscal year was 150,000 tons of lemons for Corona, and our R. & M. request was based upon that figure. Management found it had to cut the figure by 10%.

After seven months, we have processed 75% of that quantity. And we now expect to process between 180,000 and 200,000 tons. One might expect our maintenance costs to be higher by a similar ratio. But actually, at the end of six months, they were 48.7% of budget, as against a normal of 50%. Last year our R. & M. budget was overspent by 1½%.

Although we have a number of small and medium-sized vertical, single-acting ammonia compressors in various departments, the equipment in the juice products building consists of both single-stage and second-stage service (York V/W). The booster-stage machines operating at −50 deg. F. (14.3 in. Hg.) and −30 deg. F. (1.6 in. Hg.) are rotaries (York). The V/W compressors are equipped with automatic capacity reduction valves that adjust the work done to the load requirements.

The low suction pressure of the −50 F. booster stage is occasioned by the severe duty imposed upon it by the freezer tunnel, in which air at −40 deg. F. is blown downward through one, two, or three layers of cans of concentrate for lemonade.

These cans travel on wire belts, running one above the other, and in about one hour are reduced from a temperature of 18 F. to 0 F., passing through the slush-freezing state. This, requires, in round figures, 155 tons of refrigeration.

The other three levels of ammonia suction pressure are required for chilling juice immediately after extraction, cooling after pasteurization, slush-freezing, and for cold storage rooms holding 1¾ million cases at −10 F.

The maintenance inspection schedule was determined by comparing our V-8, V-12, and V-16 machines with an auto engine. At a speed of 690 rpm., the 6¾ in. bore x 5 in. stroke machine has a piston speed of 575 fpm., which compares with an auto engine traveling at 25 mph. When our log indicates a machine has operated 4,000 hr., comparing with about 100,000 miles on the auto engine, the cylinder heads and crankcase covers are removed. This allows a psysical inspection of valves, seats, sleeves, connecting rods, and crankshaft.

Upon completing 9,000 hr., each machine is completely dismantled, except for crankshaft and seal. All valves are changed and the seats resurfaced. Pistons and sleeves are checked for diameter and out-of-round. The crankshaft is miked for wear and checked for scoring and cracks. The crankcase is thoroughly cleaned, oil lines are blown out and flushed with mineral spirits. All gaskets are replaced and fresh ice machine oil of a good quality is used. Our maintenance cost on these V/W machines runs about $.10 per 1,000 ton-hours.

Considerable difficulty is experienced due to ice forming on the transfer plate at the freezer tunnel feed belt. This is caused by moisture adhering to the cold cans upon entering the tunnel. Can dryers now are manufactured in our shops, which will minimize this difficulty. The tunnel refrigerant coils are defrosted once a week, and when operating to capacity, a 2-hr. shutdown is requested in the middle of the week for a quick, on-the-run defrosting. Air units in the −10 deg. F. storage rooms, with normal usage, are defrosted every 8 to 10 days, requiring 1 hr. per unit.

We have five electric trucks (four of 3,000-lb. and one of 7,000-lb. capacity) and four gas trucks. Maintenance costs, which include battery changings, run considerably higher on the electric, principally due to battery damage, contact and commutator wear, and brush troubles. It requires about 40 min. at the end of each shift to change the five batteries. Altogether, 4 man-hr. per 24 hr. are spent on minor repairs, charging, changing batteries, etc.

8.–CORROSIVES Curbed

If you bear in mind that natural-strength lemon juice has a pH of 2.3, this acidity being principally citric acid, you will appreciate the difficulties encountered in handling our product in years past. Wooden pipe and tanks, lead-lined vacuum pans, and sheet-lead-covered floors were prevalent during the 1920's in the citric acid manufacturing field. Durimet and Duriron were used in a few applications. Duriron floor and sink drains were installed in 1938 in our Research Laboratory, and we have experienced no maintenance on them.

Vitrified clay pipe was, and still is, very satisfactory for plant waste material so long as the lines are under little or no pressure. Copper and brass were used to some extent, but this was frowned on by our technical superintendent, due to possible contamination.

In the early 1930's came the new stainless steels. Now all of our juice products are handled in type 304, 316, and 317 stainless tanks, piping, fillers, slush-freezing equipment, and low-temperature evaporator (Mojonnier). No paint is required on these shiny surfaces, and they contribute immeasurably to easy cleaning. Excellent results have been obtained with Saran pipe and fittings and (pumps (Olivite) in the pectin department, where the liquors contain a small quantity of hydrochloric acid. Valves here are flanged cast-iron plug cocks, Lith-

"Frame of Reference" in Elpco's Maintenance Picture

Incorporated in 1915, Exchange Lemon Products Co. concentrated upon processing surplus and unmarketable lemons produced by the Sunkist lemon growers of California and Arizona. It is a cooperative, owned by the Sunkist lemon packing associations of the two states.

For the first eight years products were lemon oil and citric acid. In 1923, manufacture of pectin started, followed by production of concentrated lemon juice. Development of low-temp evaporation for producing quick-frozen concentrate for lemonade, along with permission to use the brand name "Sunkist" on its top quality lemon juice products, brought about a marked expansion in the company's production facilities at Corona in 1950 and 1951.

The Damerel-Allison Co., of Covina, a citrus products plant producing juice products, oil, brined lemon and orange peel, and dried peel for cattle feed, was purchased in 1950 and is now known as the Covina Div. of Elpco. Today, the two plants have a combined floor area of 528,000 sq. ft.

During the months of heavy fruit receipts (March through July), total employment at both plants approaches 1,000. Last year's gross sales were over $25,300,000, and the value of all land, buildings, and equipment is over $8,300,000.

gowed. Many tanks throughout the plant are steel, lined with Super Flexite, though we still use many wooden tanks.

Pumps vary in the different departments. Juices are moved with pumps (Bump type) of 304 stainless steel and high nickel alloy. For pectin liquors containing diatomaceous filter aids, our pumps have alloy 32 (Electric Steel Foundry), heat treatable impellers and bodies of type 316 stainless. On a trial basis, we have used Uscolite pipe, and just recently we installed about 150 ft. of 6 in. glass fiber pipe handling plant waste water with a pH of 3.8.

Our filter cloths (Dynel) endure 10 to 15 times as long as cotton cloths, yet cost only three times as much. We now have on order a string filter (Filtration Engineers, Inc.) and have specified that the strings be made of Orlon. Liquors handled being of sulfurous acid content, the metal parts will be of type 317 stainless steel.

Some of our corrosive chemicals are concentrated H_2SO_4 muriatic acid, liquid SO_2, sulfurous acid, isopropyl alcohol, and aluminum chloride. For handling these materials and products during manufacture, we have equipment, fittings, and fasteners made of Inconel-clad steel, Monel, Everdur, the Hasteloys and Illium, besides the ones mentioned earlier. You may make your own checks on the new paints and coatings. Run tests under your own peculiar conditions.

In a new method of handling press cake of filter aid, containing sulfurous acid, we tried several different coatings on 9 in. black steel screw conveyors. However, we believe that type 316 stainless steel is the answer to this problem. We prolonged the life of one conveyor materially by welding a bead of stainless around the outer edges of the flight and radial beads on 3 in. centers.

For many years, our lemon peel, after extraction of juice, lemon oil, and pectin, was separated from the water in which it was flumed and collected in beds. This at times became malodorous. The liquid effluent, containing some juice, oil, citric acid, pectins, and particles of cellulose, and having a pH of 3.8, was ponded in a rotating pattern.

These ponds showed decreasing permeability. And last year, following the procedures and methods developed by the Exchange Orange Products Co., Ontario, we made ready a spreading area.

This land consists of a small amount of top soil over sand and gravel. A land plane leveled the soil to the natural sloping grade. Vitrified clay pipe of 12-in. dia., was laid 4 ft. underground and lateral feed lines were provided with valves. The ground was then check-furrowed and the effluent allowed to flow in at the rate which the soil would take—not allowing the furrows to overflow.

As one strip became saturated, the adjoining strip was utilized. After drying for a few days, the soil was ploughed, allowed to stand for a few days, then made ready for effluent again.

After eight or ten cycles, fresh water was run on the land and oats were sowed, using fresh water for irrigation. The crop of oats was harvested in April, and the land again prepared for effluent.

The spent peel is ground, dewatered, and dried for use as cattle feed, and we hope to rid our premises completely of both pulp beds and ponds in the near future.

9.—SANITATION Stressed

The Plant sanitarian, a member of the technical staff, in company with the sanitation foreman, department operating foreman, a helper, and a chemist, makes an inspection of each department about once a month. A six-month general inspection is made of grounds, shops, and stores. Purpose is to observe efficiency of cleaning and methods, tidiness, safety conditions of equipment, sources of contamination—and anything else concerning sanitation.

Suggestions are solicited, and the sanitarian reports findings with recommendations to the production superintendent, who carries out the recommendations if deemed advisable.

A somewhat detailed description of the clean-up in the juice department may be of interest: The washing, grading, extraction, and pressing sections usually work two 8-to-4 shifts. During both 4-hr. periods between shifts, the sanitation crew moves in. The sanitation foreman, with 10 men, divide up between the washing and grading room, the juice extraction room, and the lemon oil pressing department. Dismantling and reassembly of equipment is done by this crew.

For the ultimate in flexibility and portability, 150 gal. "detergent buggies" are equipped with pumps and "cannon ball" steam guns. The detergent (Relion) is used in these rooms —about 15 lb. per 100 gal. of water. Once a week, it is steam-gummed on all equipment, including roller graders, washers, extraction machines, and finishers. The equipment is then rinsed, followed by a chlorine water spray of 25 to 30 ppm.

Twice daily this equipment receives careful cleaning with chlorine water. To illustrate how thoroughly this is done, our chief electrician says, "These boys never miss a motor".

While operating, incidentally, chlorine water of this strength is sprayed on fruit, belts, and equipment to hold down the bacteriological count. Units (Isofeeders) are used to maintain strength of the detergent (Ampolite) employed in the fruit washers, and the detergent is completely replaced twice a day. All juice piping and plate heat exchangers are cleaned by a circulating solution, followed by rinsing and chlorine water. Infrequently, these are disassembled for more thorough cleaning.

Mixing tanks are rinsed with chlorine water after each batch. Once every day or two, they are thoroughly cleaned. Can fillers and sealers are steam cleaned once a day, and the filler rooms are given a minute cleaning weekly, requiring one full day. Can tracks and casing equipment receive a steam cleaning weekly. A detergent

make-up tank and high head pump constitute the means of cleaning the low-temperature vacuum pan.

Whereas a few years ago the procedure included actual scrubbing of the inside surfaces, now the detergent is sprayed through nozzles and rings and effectively maintains the surfaces clean.

Manholes are opened for inspection at the time of cleaning which, we have determined, should be done every 72 hr. A rinse and then chlorine water completes the cleaning operation.

Monthly bacteriological surveys of products, commonly referred to as line checks, are made at all major stations of juice production. Quarry tile floors with acid-resistant cement joints, ceramic tile walls, and tile lined drainage ditches are exceedingly worthwhile. Floors, subject to washing, slope ¼ in. per foot.

All cleaning, except a few special jobs, is performed by the operators in the following departments—Pectin, acid, neutralizing, and decomposing. Nine janitors work throughout the plant. They clean and replenish the twelve lemonade dispensers located in various buildings. They operate the insect sprays in the juice buildings, using a nonresidual insecticide, the frequency depending upon the need. All tanks are covered during this operation. Doors are screened and blowers are installed over main doorways to help prevent insects from entering. A residual spray is used on outside walls, docks, and the paving around the juice products building. Gnats, in the area of the pulp beds, are controlled by spraying with a mixture of DDT and BHC (benzene hexachloride).

Above article is taken from an address made by the author at the recent First Western Plant Maintenance Show & Conference in Los Angeles.

• • •

Hooking-In This Tank Car Meant—

No Shutdown Plant Keeps Humming

SPOTTING of a railroad tank car as a temporary source of supply of liquid sulfur dioxide recently averted a serious processing tie-up at American Maize Products Co., Roby, Ind.

In fact, it did more than that—for proving extremely convenient, it's now "kept on" as a permanent standby.

What initially "threw things out" was an essential building renovation. Necessitated was removal of a wall supporting the regular sulfur absorption equipment. So a six months' shutdown of burners and absorption tower was faced—meaning job lay-offs and inconvenience to customers. To stop that happening required some fast thinking.

Conventionally, SO_2 is piped as a gas from burners to absorption unit where, with addition of water, dilute liquid sulfurous acid is produced. This solution is used as a steeping medium. And as Mill Division Manager Kurt Aspman points out, "It is as important to us as power, water, or even the corn itself." The acid prevents undesirable bacteriological action that aids in the production of pure starch.

Possibilities of structural remedies for the difficulty, involving building of temporary facilities, got first attention. But analyses showed such approaches either were unhandy or excessive in cost.

Officials finally approached the Ansul Chemical Co. of Marinette, Wis. Ansul, which had been supplying American Maize with small quantities of liquid SO_2 for experimental purposes, came up with the answer. Why not bring in supplies, as needed, in liquid form?

Stumbling block here, was lack of a storage tank. But Ansul solved this, too. It assigned one of its railroad tank cars for the duration of the reconstruction work.

A pipeline was set in from tank car to point of use, about 100 ft. distant. And refills of the tank car were made regularly by tank truck, which hauled the chemical overnight from Marinette.

Use of the liquid SO_2 started in June, 1952, and 1,800,000 lb. of the chemical were consumed before the building work was completed 18 months later.

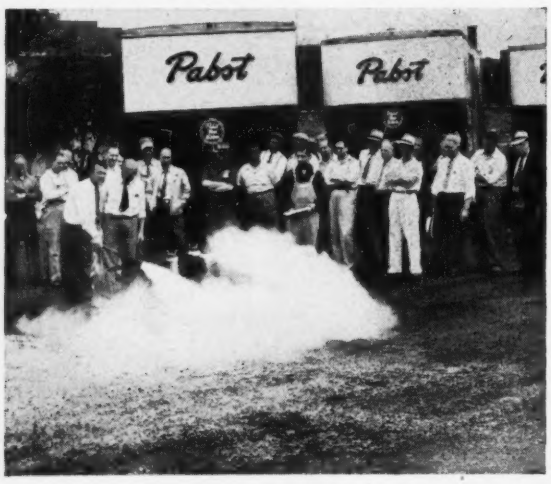
Impressive factor has been the ease with which the liquid SO_2 can be controlled. This brought the decision to return the tank car as a supplement. And some 750 lb. of the liquid now is used every operating day at stations where there are fluctuating requirements. As an additive, liquid SO_2 not only serves as insurance against spoilage but also produces an immediate increase in concentration.

A—STRATEGY AND TACTICS HUDDLE

SALIENT working points of program are pinpointed by Safety Supervisor Serles in meeting with foremen.

B–TRAINING VERSUS EMERGENCY

WORKERS really learn first-aid "know-how."



AND ways to curb fires before they can spread.

How to Make Safety a *Habit*

And So Win a Jackpot of Benefits

You do it by teaming management and employees in a cooperative effort —as demonstrated by Pabst of L. A., which has lowered injuries per million man-hours fully 70% under the national figure

FE STAFF

"Fewer brewery workers were injured on the job in 1953 than in any previous year in modern times."

This notable record was cited by Edward V. Lahey, president, United States Brewers' Foundation, while making the organization's safety awards at a recent convention.

Among the top 1953 winners was Los Angeles Brewing Co., Pabst Brewing Co.'s Los Angeles operation, with a striking score of only 5.84 injuries per million man-hours worked. That's 13.46 under the injury frequency throughout the field for that year—19.3 per million man-hours. In 1948, when the safety campaign was authorized by the foundation, it was 35.

Aside from the individual employee's health and safety—and in some instances the safety of the public—the company has found its program results in a number of other benefits. And these accrue to employees as well as the company. Here is how J. G. Shakman, vice-president in charge of operations, explains the company's attitude:

"Accident prevention is not a new interest with us. It is a development that extends over a period of years. We

C—SAFETY EQUIPMENT AND DEVICES

"SPACE-SUIT" fully protects tank cleaners.

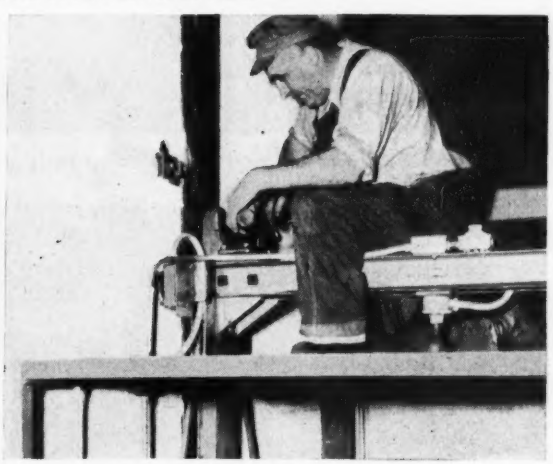
BULWARKED SHOES guard feet from falling kegs.

MASKS shield lungs from gas and dust hazards.

SHOWERS are handy to counter acid sprays.

D—PREVENTIVE MAINTENANCE

MECHANICS make sure trucks are in top order.



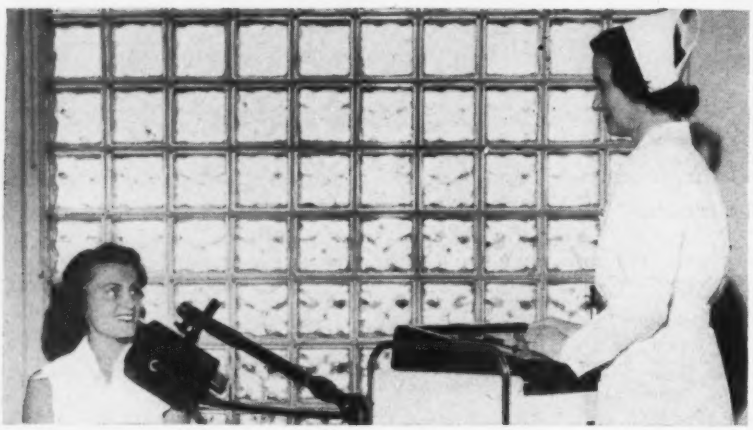
ALSO see that plant facilities are A-1

believe the progress we've made in recent years is due not only to our planning but also to our employees' cooperative effort and interest in safety. We want to provide a safe place to work. And to assure safety, we conduct a program that keeps everyone alert to hazards wherever they may exist.

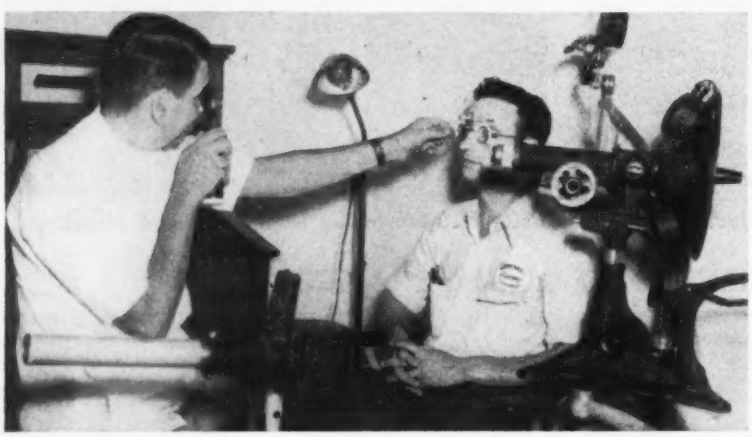
"One of the prerequisites to safety, and also to contented employees, is good health. We provide the utmost in facilities to check and maintain the well-being of our people. Poor health contributes to the causes of accidents. It is the healthy and alert worker who plays the most important part in accident prevention.

"Experience recorded by The National Safety Council indicates that nearly 90% of all accidents are due to human errors or failures. The company has a double-barreled program aimed to keep each employee in good health and help him train himself to develop safe work habits so as to avoid accidents. Full cooperation and high respect for safety rules by employees is necessary to hold accidents to a minimum".

E—HEALTH SERVICES



MEDICAL UNIT is ever-ready for prompt action.



VISION-PERFORMANCE and safety constantly are stressed.

AND COMPANY PLAN teams with local health services.

At Pabst there is a tri-part setup of safety committees. These groups meet at regular intervals to discuss means of developing an awareness to, and the importance of, safety—from the economic as well as the individual standpoint.

The top management safety committee is chairman'd by the safety supervisor of the plant. Members of this committee represent every department in the plant. On it are two vice-presidents, the assistant secretary-treasurer, the plant superintendent, the assistant plant superintendent, superintendents from the brewery, bottling, and traffic departments, also the plant engineer and the personnel manager.

The committee forming the next echelon in this program comprises top foremen and is chairman'd by the plant safety supervisor. Other committees are composed of members from each department of the plant, and they operate in much the same manner as the foremen's committee.

Thus the voice of all levels of employees can be heard by supervisory and top management. Suggestions originate from the lower levels, filter upward through these committees to the top, and there final approval and action is taken on them. By an integration of the efforts of these committees and by stressing the need and importance of effective accident prevention, the company is able to reach and impress employees at all levels.

Success of the program has been evidenced during the past four years by the eight outstanding safety awards received by the company. These awards have served as yardsticks to measure the performance of the programs. At the Los Angeles plant, safety awards of the United States Brewers' Foundation have been won for the years 1950, '51, and '52, in addition to those won in 1953. All breweries in the nation compete for these prizes.

Publicity plays an important part in a safety program. Emplovee's magazines, appropriate signs, bulletins, etc., are used liberally in an education campaign. The importance of influencing employees cannot be over-stressed. Such programs must be kept continually alive to be effective.

Operating out of Pabst Brewing Co.'s Los Angeles Division, 300 motor vehicles travel some 2,500,000 miles yearly. In the course of such extensive operations many incidents or accidents occur. And none is considered too small or insignificant to be placed before the top management safety committee. In fact, all accident reports are reviewed in detail by this committee.

As an example, a particular driver

may have a series of accidents over a period of time. The committee will want to ascertain the probable or actual cause of these. If there is no apparent reason other than lack of caution or poor coordination of mind and body, a physical examination may be advised. Or outside emotional influences may be suspected.

If these investigations do not determine the cause, a personal interview by the employee's superior is suggested. In addition, a close study may be made of the driver's habits.

Most generally this type of review reveals the underlying cause of the employee's poor record, and often it may be corrected by a proper psychological approach.

Equipment, too, is subjected to as detailed and exhaustive a study as personnel. Supervisors and management personnel are trained to recognize and correct unsafe equipment, conditions, and practices. Employees are encouraged to suggest ways to eliminate job hazards and such conditions as tend to lead to unsafe acts.

In the interest of accident control, careful analysis of each personal accident or injury is important in order to determine means of prevention. The committee conferences become study meetings for this purpose.

Design and use of safety equipment has progressed greatly in recent years. Employment of such devices, which are made available to all workers, is required throughout the entire plant.

Sometimes employees resent the use of the devices on the contention that they make operations clumsy. However, their use definitely pays off—and this fact must be "sold" to the workers through education. Then the worker will not feel self-conscious when such equipment may seem to make him look like a "man from Mars" when doing an assigned task.

Good housekeeping comes in for prime attention in assuring safe conditions. Inspection tours are made by the safety committee to check whether all areas and operations are ship-shape. Findings are discussed at the monthly meetings, and items that might prove to be safety hazards are spotlighted.

• • •

FE STAFF

Using These Cellular Glass Blocks—

Today's Roof Insulation Is *Tomorrow's* Flooring

When building an addition to your existing facilities, it's good engineering to assure "expansibility of the expansion."

This thinking was followed in construction of the new cooling facilities recently added to the Kalamazoo, Mich., plant of Peter Eckrich & Sons, Inc., Fort Wayne, Ind., meat packer.

Use of Foamglas* as insulating material in the new section enables future enlargement of refrigerated space at minimum installation and operating costs. Today, the Foamglas is roof insulation; tomorrow it may become floor insulation—that is, of a new second story.

Here are details of the development: The firm's current business warranted the addition, and decision was made to construct a reinforced concrete-and-brick unit. The new section, encompassing 14,300 sq. ft., divided into a chill, a packing, and a finished product cooler, doubled the plant's refrigeration space.

Eckrich's chief engineer, Chester Schmidt, particularly had noted the considerable expense involved, in recent years, in constructing additional facilities in the meat packing field. And it was figured that this factor necessitated built-in flexibility.

Accordingly, the architects designed the new portion as a concrete superstructure, with non-load bearing curtain walls and a flat, reinforced concrete roof. Thus, further expansion is feasible both horizontally and vertically. Walls readily can be removed for lateral enlargement, while the existing roof can, as indicated, be used as the floor of a new second story.

The specific glass-type insulation was specified for the entire envelope—flooring, walls, and roof. It is cited as a material that is rigid, vermin-proof, and moisture-resistant, with high compressive strength and retaining constant insulating value.

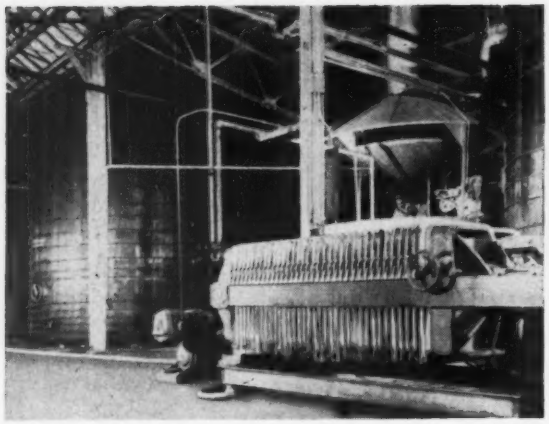
In this instance, its rigidity and compressive strength were considered of special advantage. Here's why:

Procedure was to apply the material to the roof of the new section and cover it with standard built-in roofing. Thus, if a second story is to be added at a later date, a concrete wearing surface can be poured directly over the insulation.

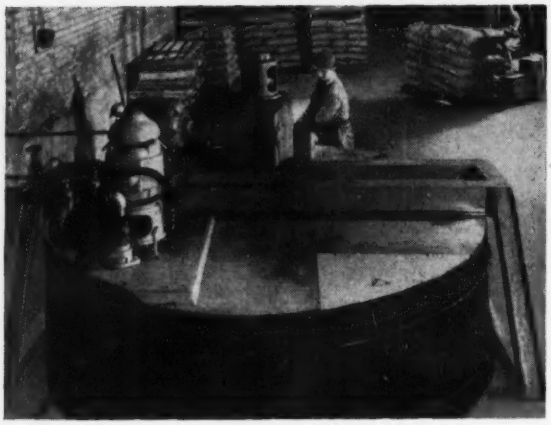
So no additional reinforcing will be required to support the new floor. The insulating material can carry the weight. In fact, it is being used in this manner on the floor of the addition (see photo).

Further, states Mr. Schmidt, the material's characteristics as a roof insulation alone are desirable, it being less liable to punctures. Common hazard in event of roof punctures is absorption of moisture and consequent loss of insulation value. But the new material, he points out, is moisture resistant. He also finds this quality of prime importance in the walls.

*Product of Pittsburg Corning Corp.



1 JUICE first is fermented under controlled conditions, then clarified in plate-and-frame filter.



2 CLARIFIED wine next is sweetened in submerged mixer. Blending in 66,000-gal. batches follows.

Production Streamlined On *Semicircular* Line

Winery layout engineered to abolish criss-crossing of material flow and cramped space. Output multiplied by advanced filtering, heating, refrigerating, blending, bottling, and materials handling

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Just visualize a single-story semi-circular plant—like a ")"—that saves floor space and gets smoother process flow with no back-tracking.

That's the layout and performance at Mogen David Wine Corp.'s new smartly designed $2,000,000 Chicago winery now handling 10,000,000 gal. annually.

And the attainment of efficient, uninterrupted, production goes much deeper than layout:

Ultra-modern equipment and advanced methods also permit four men, (assisted by an equal number of full-time chemists) to carry out all phases of wine-making, fermenting, sweetening, blending, clarifying, refrigerating, aging, preheating, and polishing.

Only when the wine reaches the point where it is bottled hot do others take over. And here, too, it's the modern way, with bottling and shipping departments fully mechanized.

As for the simplified, unimpeded flow of wine: At both ends of the semi-circular pattern line, and thus opposite each other, are the raw materials receiving and shipping departments. The operations—from fermenting to the point where the wine is pasteurized and readied for bottling—are carried out along one arm of the semi-circle. At the mid-point, empty bottles are fed into the line. Then bottling, storage, and shipping occupy the remainder of the line.

This streamlined winery occupies over two acres, and it is exclusively devoted to the making of a sweet concord wine, which is sold under the brand name Mogen David.

Year 'Round Operations

Processing is not seasonal at the Mogen David winery. Instead, it is carried out 12 months a year, 24 hr. a day. Single-strength concord juice is tank-truck shipped from carefully selected processors in New York State's Finger Lakes region as well as from Ohio and Michigan.

Prior to shipment, juice is at 28 deg. F. in tanks targeted by overhead u.v. germicidal lamps. With most of the tartrates settled out, juice then is shipped (at 28 F.) in insulated, 8,200-gal. tank cars.

According to David Wiernik, vice-president in charge of production and laboratories, careful checking of each processing operation is not enough to assure conformance to firm standards. That's why grapes are checked prior to crushing and the juice is analyzed before shipping and upon arrival at the winery. Too, juice-producing plants and their operations are periodically checked for adherence to sanitary standards.

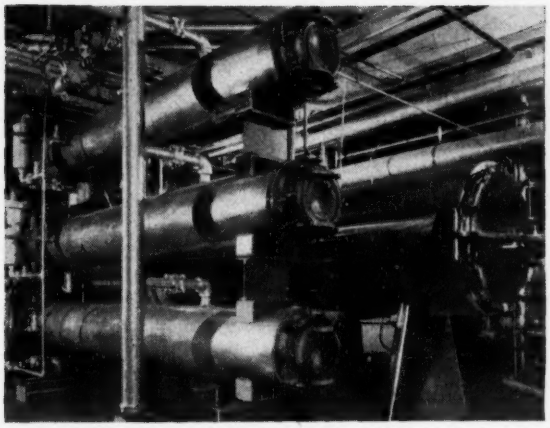
Bulk of the juice is shipped in cold weather—between November and March. Maximum rolling time of tank cars is 2 days. Tank truck shipments out of Michigan take about 4 hr.

Precautionary Measures

Arriving at the unloading dock, which handles 10 tank cars, a tank car of juice is directly pumped into vertical, redwood fermenting tanks. Capacity of the fermenters is 1½-2,000,000 gal.

Using a pure yeast strain, especially developed for this wine, fermentation

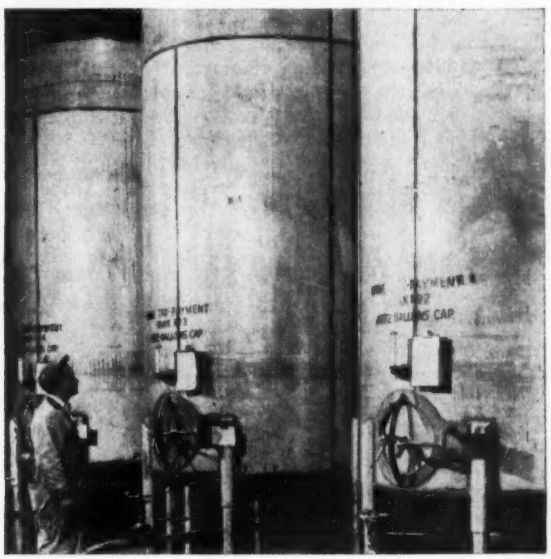
Of Wine in Process



3 **BLENDED** wine is chilled in heat-exchangers and stored in 100,000-gal.-capacity, 20-F. room.

4 **CHILLED** wine is clarified in giant filter unit that removes the suspended tartrates.

5 **FROM FILTER,** wine is pumped into ageing tanks. Total storage capacity is about 2,000,000 gal.



6 **WINE,** now ready for bottling, is stored in these stainless steel, "tax-paid" tanks.

is conducted under strictly controlled conditions. For example, sufficient SO_2 is bubbled into the fermenting wine to curb growth of spoilage organisms. In an amount determined by the control laboratory, the SO_2 is rubber-hose fed from a cylinder suspended from a scale.

Measures are taken to keep the winery insect-free. Big offenders are fruit flies. Employed are six ½-gal.-capacity hand-type aerosol-fog insecticide generators and a portable 5-gal.-capacity sprayer.

As another safeguard, optimum fermenting temperature is maintained by running the must through a tubular-type (twelve 24-ft. tubes) heat-exchanger. Hot or cold water is employed as the heat-exchange media. Latter is regulated by flowrate.

Spotted in the ceiling of the winery are 1½-ft.-dia. exhaust fans to remove CO_2, curb moisture condensation, and keep air in circulation.

Continuous Clarification

Impressive is the company-devised system for continuously filtering wine directly from fermenters to sweetening tank. Key to the operation is the method of continuously proportioning filter aid to the 3,000-gal. wooden slurry tank that feeds a horizontal plate-and-frame filter equipped with 35 plates using filter cloth and paper. Maximum capacity of the filter is 10,000 gal. per hr.

The filter is first pre-coated by spilling three 50-lb. bags of filter aid into the slurry tank, mixing it with 3,000 gal. of fermented wine, using a vertical propeller-type agitator, and then recirculating through the filter.

From here on, additional filter aid is continuously fed into the slurry tank by means of a specially engineered proportioning system. Involved is a rectangular feed hopper (800-lb. capacity) that delivers filter aid to an enclosed ¾x12-ft. worm-screw conveyor. An adjustable gear drive, hooked to the incline worm screw, proportions filter aid into the slurry tank.

Amount of filter aid continuously fed into the slurry tank is influenced by the rate of the filter. For example, rate of filtration is 6,000 gal. hourly, then filter aid is proportioned at the rate of 500 lb. an hour.

As a precaution against filter aid

dust accumulation in the winery, the slurry tank is equipped with a conical, metal hood. Above the hood is an 18-in. exhaust fan that is activated during the operation.

Steady filtration and uniformly clear wine are achieved with the aid of an adjustable-speed motor. As pressure on the filter's discharge gage drops, for example, speed of the motor is increased by manually operating a lever.

To achieve speed, the filter is automatically opened and closed with the aid of a hydraulically operated device. One operator now performs the work formerly required by two men.

Sanitation has been improved, cleaning operations simplified, and clogging risks eliminated by installation of longitudinal floor drains. These are grate-covered.

The drains (1x1 ft.) run the length of the fermenting room. They are most desirable from an operating and safety standpoint. And they eliminate the need for sloped floors, as when separate drains are installed at various locations in a floor area. Now lees at the bottom of fermenters are merely spilled into the drains, which then sluice them into a sump going to the sewer.

Sweetening of the wine is carried out by dumping sugar (from 100-lb. bags) into a waist-high, 3,700-gal. mixing tank equipped with a vertical-type agitator. During the sweetening operation, the wine is recirculated from mixing to 33,000-gal. blending tanks. The latter also are equipped with vertical-type agitators.

Simplified Sweetening

Sugar is unloaded from box cars by fork-lift trucks that handle a pallet load of 21 bags. Bags of filter aid are handled in the same manner. Both sugar and filter aid are stored in the sweetening room. Two blower-type heaters and a 4-ft.-dia. fan prevent caking of the sugar, thus speeding the sweetening operation.

Often, double handling of sugar is eliminated by roller-conveying bagged sugar directly from box car to mixing tank.

In Time-Honored Tradition

It was the firm's desire for a name that the average Jewish consumer would remember that led to adoption (in 1939) of the brand name Mogen David. This is the name of the six-pointed star or shield of David. Today, it is represented in the flag of Israel.

Since the word "kosher" is carried on the label, two orthodox rabbis supervise production and bottling. Here, Biblical traditions still apply. Giant redwood vats, for example, are cleansed seven times with hot water (although a "special dispensation" further permits use of steam).

It is notable that product excellence has extended the popularity of the wine well beyond the sphere of the Jewish trade.

Wine Stabilizing Techniques

Batches are blended in volumes of 66,000 gal. Blend variations are avoided by using wines of different ages produced from grapes of different vintages. Each batch is lab-checked before and after blending to make certain that it conforms to standard.

Blended wines are now chilled to 20 deg. F. as they go through a tubular type Mojonnier heat-exchanger. Rate of flow is 4,200 gal. an hr. An automatic regulator controls the feed of ammonia from a roof-located cylinder to the stainless steel heat-exchanger. For standby purposes, there are three sets of horizontal, ammonia-refrigerated Hasselberg heat exchangers.

Chilled wines then are pumped into redwood tanks (100,000-gal. capacity) in a refrigerated room. Temperature of this room is kept at 20 F. by a Freon-refrigerated, blower-type unit, with exhaust ducts faced in all directions to cover the entire room. Precipitation of undesirable tartrates takes place after 2 days' holding in this room.

Supplying refrigeration for all cooling operations are three ammonia compressors—50, 75, and 100 tons.

Coming from the refrigerated room, wines are clarified by running through a second plate-and-frame filter (35 plates) in the same manner as the fermented wines. Clarified wines then are pumped into 1½-2,000,000-gal.-capacity storage tanks for ageing.

To achieve further stability, wines pass through a cabinet-type Walker-Wallace heat-exchanger. Heated to 135 F., wines are clarified a third time in a plate-and-frame filter (30 plates). Heating separates out heat-unstable colloidal matter.

Significant are the efficiences attained through the installation of four 5,000-gal. federal tax-paid tanks. This simple step eliminates the task of applying federal stamps to each case of wine. In addition, it simplifies bookkeeping.

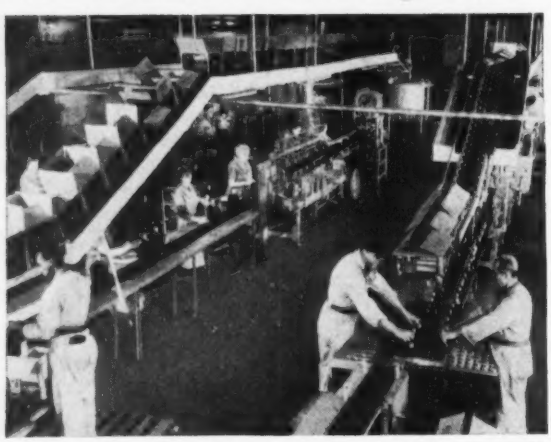
High Volume Bottling

Tax-paid wine is heated to 145-150 deg. F., in a Walker-Wallace heat-exchanger, for delivery to two 400-gal. stainless steel, steam-jacketed, glass-lined mixing tanks, which are platform-mounted.

Lines feeding four 120-bottles-per-min. filling machines are equipped

(*Turn to page 170*)

Four 120-Per-Min. Bottling Lines



FLEXIBLE bottling lines are readily adjustable to handle eight different size bottles of wine.

CASED WINES are loaded onto pallets for fork-truck transporting to finished-goods storage.

EVENING WEDNESDAY

Having picked up loads at plants, "piggyback" trailers go directly on flat cars. They're seen about to be pulled out of Chicago by scheduled night train.

EARLY THURSDAY

Arriving at Wisconsin city, trailers roll-off handily via portable lightweight ramp. Wheels at ramp's fulcrum permit easy movement of this unit from track to track by towbar (seen cradled in "V" of runway).

Food Trailers Travel "RR Piggyback"

Cutting 5 Handlings Down to 2

THAT NEW train-trailer service—popularly dubbed the "piggyback" operation—definitely is winning its way among food processors.

Midwest companies, for instance, are finding that the Chicago & North Western Railway Co.'s version of this service is reducing time and labor of delivering their products—and at no increase in regular rates.

Briefly, piggybacking is the operation of carrying trailers inter-city on RR flat cars rather than hauling them over the highway.

Where permanent loading facilities aren't available, the North Western uses portable ramps to expedite entrainment and detrainment of the vehicles. This railroad launched its piggybacking with the distinct aim of matching or bettering transportation time required by the common or contract motor carriers.

Under ordinary rail procedure of shipping food, loads are picked up by truck or trailer in the origin city, assembled in a terminal, then put aboard freight cars for movement to the destination cities. There they are disassembled and again loaded into trucks or trailers for final deliveries to consignees.

Note that this involves five separate handlings.

But with the piggyback system, a food processor has a trailer backed up to his handling dock, where it is loaded, moved to the railroad assembly yard, then wheeled onto a flat car. Arriving at the destination city, the trailer is rolled off and proceeds directly to the consignee—all without any

Launching of New Piggybacks Hobbled By Question of RR-Owned Trailers

Plans of six railroads to start piggyback ventures were flagged down in June by the Interstate Commerce Commission, which suspended rate schedules for the proposed services. But by July, protests had brought ICC to reconsider. Then again the piggybacks were "highballed on their way.

The trouble grew out of claims by trucking interests that the specific feature of trailer services being owned and operated by railroads constituted unfair competition. And ICC then ordered the suspension while it investigated.

As this issue of FE went to press, a hearing was getting under way in Washington.

Roads whose plans were involved were the Pennsylvania, Erie, Lackawanna, Nickel Plate, B&O, and Wabash. Those lines already operating piggybacks—such as the Chicago & North Western, whose service is described here—had not been affected by the June ruling and so had carried on.

interim handling of shipments inside.

This is analogous to the movement by a motor carrier, except that with the motor carrier the haul between cities is made with a road tractor.

P-train arrivals are scheduled for early morning hours to enable deliveries to consignees the same morning.

Service Augmented

The North Western system works in both directions between Chicago and Minneapolis, St. Paul, Green Bay, Wis., and Omaha. It was inaugurated at Green Bay in Aug. 1953, extended to the Twin Cities and Omaha in November, and to Milwaukee in December. Flat cars carrying loaded trailers for intermediate points are cut out of the train where required.

As of April of this year, 25 flat cars and 48 trailers were in use in the system with additional flat cars and trailers being planned as volume increases.

Not all l.c.l. (less than carload) freight moving between the terminal cities or intermediate points is carried piggyback. The latter applies only to those shipments destined for the same cities and combining a weight or bulk approximating the weight minimum or the cubical capacity of the trailer.

The railroad prefers to have only one shipment to one trailer. But several shipments of combined minimum weight or bulk capacity may be grouped in one trailer, with shipments from different sources going to the same consignee.

Such loads are assembled by routing the trailers through series of pick-ups at the various food processing plants employing the new service. Or the load may be assembled at a terminal from pick-ups made by other vehicles. The North Western, however, restricts its over-track service to its own trailers.

In the conventional piggyback operation, trailers are loaded onto, and removed from, flat cars by tractors moving up or down a permanent earthen or concrete ramp at the end of a stub track, with the top of the ramp level with the flat car floor.

This method, sometimes called "circus loading," has been in use for many years and is simple and economical. It does not require special flat cars, costly terminal facilities (such as depressed tracks or raised docks), or elaborate and expensive handling equipment.

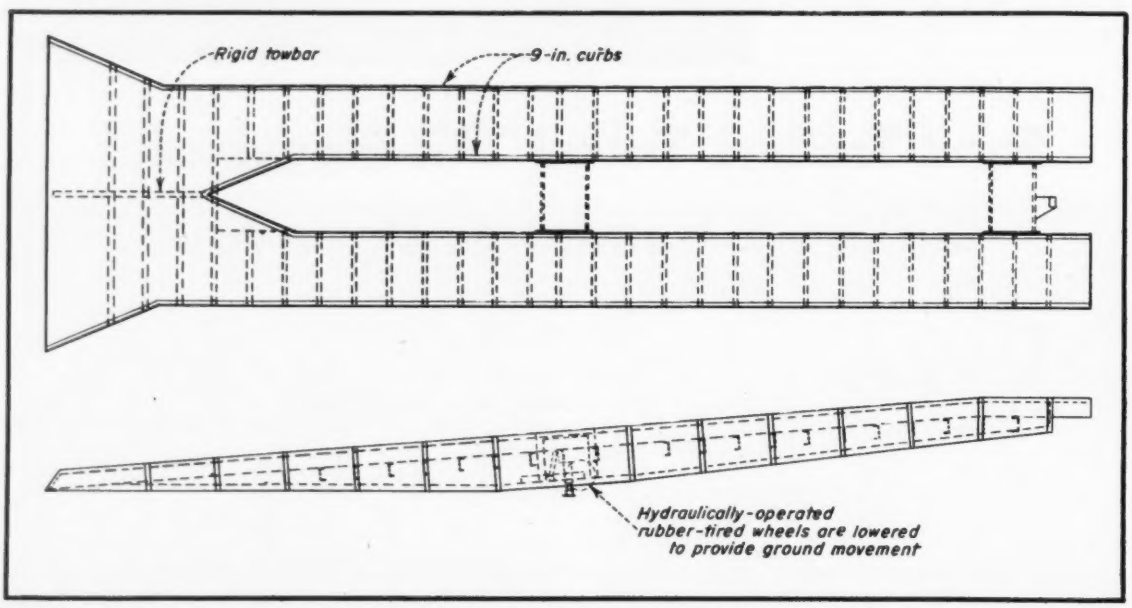
However, when five cars loaded with ten trailers (two to the car) are lined up at the ramp for unloading, the tractor has to make 10 round trips or 20 one-way movements over the ramp. And to reach the last trailer, the tractor would have to traverse the entire distance over the five cars.

Advantages of Portable Ramp

The use of a portable ramp overcomes this difficulty, provided the trailer train is split and the flat cars spotted far enough apart. Then many existing loading tracks may be utilized, making possible small or large-scale operations at much less work and expense. For the portable ramps readily may be moved over the ground from track to track. Or they may be transported on flat cars to widely separated tracks in the same yard or even to different cities to meet changes in the volume of piggyback operations.

Another advantage of the movable ramp is the high degree of selectivity which the railroad thus obtains in spotting particular trailers.

For example, if the trailer to be unloaded first were on the far end of a



DETAILS of magnesium ramp. Position of rigid towbar is seen top left. And mechanism of retractable maneuvering wheels is indicated above in side view. Note lip (right) that fits to car.

five-car train backed into a fixed ramp, all nine trailers first would have to be unloaded to get to it. But with the train split and the car with the wanted trailer isolated, the portable ramp enables unloading it directly from either end of the car.

The ramp used by the North Western is of lightweight magnesium. Made by the Magnesium Co. of America, it is said to be the largest such unit fabricated from that material. It consists of two long tracks suitably cross braced at both ends and center to form one integral framework. The whole is mounted on two roller-bearing rubber-tired wheels. These are set on a manually-operated hydraulic cylinder device attached to the inside of the center cross brace.

In operation, one end of the ramp is attached to the end of the flat car. Then the unit's wheels are raised entirely off the ground so as to anchor the ramp while in use. To move the ramp, the end attached to the flat car is unloosened and the wheels returned downward through action of the hydraulic device.

Further application of the hydraulic pressure lifts the entire ramp off the ground, giving it the position of a see-saw which is supported only at the center.

The ramp is roughly 45 ft. long and 9 to 11 ft. wide, and it weighs only 4,800 lb. Its cross braces and runway stiffeners are welded into place. The end which rests on the ground when in use is flared out to 11-ft. width to permit easy approaches and back-ups. Both sides of each runway have 9 in. curbs to prevent runoffs and excessive tire wear.

Maneuverability Plus Strength

For movement in its raised or see-saw position, the ramp is fitted with a rigid towbar at the ground end. Hence, the slight movement required in positioning at the car-end can be done by only two men, though for any extended movement, as from one track to another, it is quicker and easier to hook up the towbar to a tractor.

Notable Design

Perhaps the most notable feature of the ramp is the design of the side members of the runways upon which the tractor and trailer tires run. These side members taper to their deepest width at the center, where the ramp's wheels are located. Such construction makes it possible to combine a slight runway grade from the ground with maximum strength, since the runway from the center wheels to the ground-end thus rests firmly upon the ground when the ramp is in use.

This lightweight ramp can support tractor-trailer gross weights to 100,000 lb. and axle loads to 60,000 lb.

• • •

Cites the Solubles

As Coffee-Flavor Source

Gives nod to powders after weighing pros and cons of a half-dozen ways to derive popular "java" taste for use in varied foods

H. B. KING
Director of Research & Development, Holiday Brands, Inc., Walpole, Mass.

Having decided to employ coffee-flavor in a food product, the processor's next step is to settle upon the source best suiting the requirements of the particular product and process involved.

There are six general sources:

1–A brew or extract made by the processor himself
2–Commercially available extracts and concentrates
3–So-called coffee "pastes"
4–Frozen concentrates
5–Alcoholic extracts
6–Dry soluble coffees

Least recommended is the first named–the processor's own brew. For coffee varies considerably from lot to lot, from one variety to another, and from one season to another. Uniformity only can be achieved through efforts of a skilled and expert coffee man. And due to either inefficient extraction equipment, or to expense of equipment and its operation, cost of this method is practically prohibitive. Commercially available extracts will almost always be more uniform and less expensive.

Coffee pastes generally consist of extract to which sufficient starchy filler has been added to make a pasty consistency. These contain a relatively high percentage of water and are unsuitable for products requiring careful moisture control, such as hard candies and pudding powders.

Concentrates Perishable

Fluid concentrates labeled "pure coffee" are usable for syrup and ice cream flavoring. Here, there should be insistence upon a guaranteed pure coffee solids content. One disadvantage of this product is its poor keeping quality. Unless properly preserved, it is subject to fermentation and physical and chemical deterioration.

Freezing is a highly satisfactory method of prolonging keeping quality of coffee extracts, but they must be kept frozen until ready for use. All of the above-mentioned products will gradually lose flavor during storage.

Alcohol extracts somewhat different substances from coffee beans than water. Resulting extract does not have a true coffee flavor.

All the disadvantages of the foregoing are overcome by the pure dry soluble coffees. They are produced by a water extraction from roasted coffee beans, with subsequent removal of the water, leaving only the dry flavor substances.

From the point of convenience, ease of handling, low shipping cost, small storage space, suitability of formula requirements, and economy, these products are the preferred source of coffee flavor for the food manufacturer.

Broad Potential

—for employment of coffee flavorings is pointed up by flourishing sales of coffee ice cream and coffee "milk" in southern New England and the New York City area.

"We also are quite familiar," says Author King, "with coffee-flavored confections and, to a lesser extent, with coffee icings and fillings for baked goods, and coffee-flavored carbonated beverages.

"Why stop there? Beckoning, too, are uses of this appealing flavor in gelatin, pudding powder, and pie-filling products.

"And in addition to its distinctive flavor when used alone, there are a variety of blends that are new and tempting. For coffee readily combines with vanilla, chocolate (to make mocha), maple, rum, brandy, and anise."

SPEAKERS at morning session of food engineering symposium. Left to right, Robert A. Whitmore, Food Machinery & Chemical Corp.; Raymond Stevens, Arthur D. Little, Inc.; Lawrence Atkin, Fleischmann Laboratories; Chairman Curtis E. Maier, Continental Can Co., Inc.; and Frank K. Lawler, "Food Engineering."

Full-Day IFT Symposium Stresses Key Role of Food Engineering

Twelve speakers evaluate its significance to success and progress. Present advances in canning, evaporation, packaging, and control

BECAUSE of its great and growing importance in the field of food manufacturing, food engineering was the subject of a full-day session at the annual meeting of the Institute of Food Technologists in Los Angeles, June 27-July 1.

Organized and presided over by Curtis E. Maier, general manager of research at Continental Can Co., this session outlined and pinpointed the role and achievements of food engineering in the progress of the industry. In his introductory remarks, Dr. Maier emphasized the need for wider application of engineering in the industry and pointed to its key place in the technical operation and economic success of food processing.

TECHNICAL TEAM ESSENTIAL

The team—the food engineer and the food technologist—required to handle present-day problems and contribute to future progress, was discussed by Frank K. Lawler, editor of FOOD ENGINEERING. Here are some key points from his talk:

This is the era of rapid—and often revolutionary—change and advancement in food factory operations. It is the period in which the last vestiges of kitchen mechanics are going into the discard. It is the time when the cake maker, the candy maker, the sausage maker—and all the other makers—become manufacturers in the true industrial sense of the word.

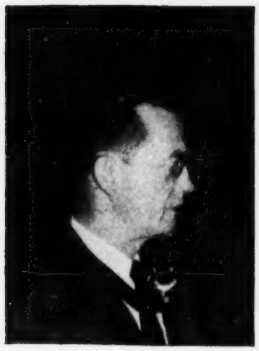
It really is a tremendously interesting, inspiring, and challenging time in the industry's development. But let us make no mistake. It is a time of the survival of the fittest. We are in a highly competitive, low-profit-margin industry. And when the pace-setters make cost-cutting, quality improving advances, those who stand still are in trouble.

The food engineer can effect sales in two ways. He can lower the price for the same quality. Or he can raise the quality for the same price. He does this by cutting the cost of food plant operations which add no value to the product. And this permits expense to be added where it increases value.

When food preservation and manufacturing stepped from the kitchen into the factory, food chemistry and bacteriology became of vital importance to success.

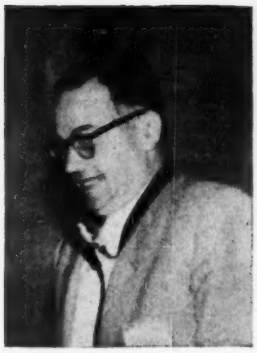
Applied science is no less important today. Without it few unit operations in food manufacture and preservation could be successfully carried out. Without it we could look forward to little further progress.

So we have two essential technical forces in food factory operations—science and engineering. Each of these is required for successful performance nearly every step of the way—from raw materials to the finished product on the

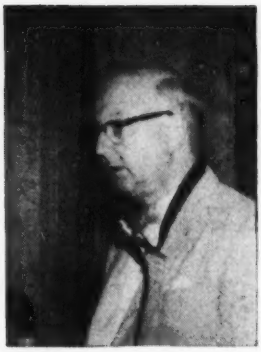


Lawler: 10,000 *more engineers needed*

Whitmore: *Four avenues of mechanization*



Atkin: *Engineer must control process*



Stevens: *Big reservoir of opportunity*

grocer's shelf. And here we have the vital food engineer-food technologist team.

Here's what it takes to function as a full-fledged food engineer: (1) Have good knowledge of food chemistry and bacteriology. (2) Know thermodynamics and the principles of mechanical action. (3) Be well grounded in physics and mathematics. (4) Know materials of which structures, machines, and packages are made. And (5) have a thorough knowledge of the technical functions and operations involved in food manufacturing.

Engineering also is a state of mind, or a particular approach to problems. The engineer looks first at the mechanics and the economics of an operation. He, by nature, favors the simplest, quickest, and most direct method compatible with the quality of result desired.

Food manufacturing developments coming in the future will challenge the food engineer-food technologist know-how. It will take this team to adapt and adopt them, to operate and control them. Real honest-to-goodness engineering will be needed. The engineering approach is essential.

These demands for technical teamwork lead us to a serious and challenging situation. Our industry is critically short of the kind of technical teamwork that will permit it to modernize and expand as dictated by economic pressures and business opportunities.

There are 10,000 food factories (of a total of 36,000) with 20 to 99 employees. Each of these needs this team of technical know-how. Another 3,000 food factories have 100 or more employees. On the average, each of these can use two of the teams. Then at least 1,000 companies producing equipment and "technical" materials and supplies for the industry each need at least one food engineer-food technologist team.

This adds up to 17,000. There now are about 7,000 engineers in the industry. So 10,000 more are needed.

By way of comparison, the chemical processing industry has at least 35,000 chemical engineers and 10,225 plants with more than 20 employees.

A survey of men directing the operations in food plants reveals that 70% find food engineering involved in their work. Among research directors, food technologists, and chemists, the figure is 74%. Considering the number of corporate officials, managers or superintendents, scientists, engineers, and others in key positions in the industry, this adds up to a lot of engineering.

The food industry is spending 800 million to a billion dollars annually for new plants and equipment. Some big companies put $5,000,000 and more a year into modernization. And the pace-setters report intentions to increase the capital investment per worker significantly in the next 5 to 10 years.

On top of this, the industry came into 1954 with the greatest demand ever for its products, particularly the newer convenience items. It will take modernization and the food engineering-technologist team to capitalize on this opportunity. And only through engineering can the results of research and product development be put into commercial production at a profit.

Although up slightly in the last half of 1953, the average food manufacturer's profit was then only 2.4c. on the sales dollar. That is by no means enough. And the only way to raise it is to engineer more efficiency into operations, put profitable new products on the market, and improve existing products in relation to competing items.

Again, it is the engineer-technologist team that can do it; and only this team, led by enlightened management, will take the industry forward to full achievement of its opportunity.

ENGINEERING BETTER PROCESSES

Engineering aspects of food-production unit processes were covered in a paper by Paul C. Wilbur and Robert A. Whitmore, Food Machinery & Chemical Corp., the paper being presented by Mr. Whitmore. Highlights from this paper follow:

An example may emphasize the striking change in unit production processes. Let us look at a corn preparation line of an early plant. The equipment per worker consisted of a sharp knife and bucket, representing an investment of perhaps a dollar and a half. Worker pay was about 15c. per hour, and worker production averaged possibly 6 ears of corn per minute.

Contrast this picture with the present situation. The investment in unit equipment per worker has increased 600 to 700 times; wages have risen tenfold, and production thirtyfold.

This mechanization of unit processes, and rise in both wages and capital investment per worker, provide an increasing incentive for development of higher operating speeds. For example, if the capacity of a filling machine can be doubled by an increase in capital investment of 20%, and if there is a rise of 20% in taxes, maintenance, insurance, and the workers' wage level, still the cost per unit production is decreased to approximately six-tenths of the cost per unit on the slower speed machine.

The mechanization of unit processes has attained a considerable degree of success, but there are few so complete that further development is unlikely. Present activity is broadly directed along four avenues:

First, increase in operational speed of presently mechanized units.

Second, replacement of presently required manual labor by automatic equipment. Color and defect sorting by hand, a unit operation of many food industries, remains a challenge to design engineers.

A third line of development is the integration of several

FIRST ROUND of speakers in afternoon. Left to right: Vernon C. Praschan, Clinton Foods, Inc.; L. V. Burton, Packaging Institute; Chairman Curtis E. Maier; and Alan Richardson, California Packing Corp.

Richardson: *Mechanize food preparation*

Praschan: *Design for easy cleaning*

Burton: *Packaging labor 59.4% of total*

☆

unit processes into operating systems. An aseptic canning line, for instance, represents the integration of a number of unit processes into a complex operating system.

Finally, a consistent and continuing effort is being made to develop mechanical methods for hand harvesting operations. The machine harvesting of pole beans and of asparagus are two advancements currently under test.

The search for increased efficiency and higher capacity of processing equipment has led to the development of highly specialized machines. Certain machines, as corn huskers, may be useful for only one product. Other machines, as continuous cookers, which result in pronounced labor saving over retort operation, are designed to handle an increasing range of container sizes and to be flexible with respect to speed of operation and process temperatures. This flexibility is related to diversification of products, an acute problem in a seasonal industry.

The overall effect of these developments is to lower the production costs of large processors who can afford to install highly specialized equipment, and who have the resources to operate at maximum capacity. In turn, the increased number of larger plants provides a market for specialized equipment, so that equipment manufacturers can profitably develop, design, and build such machines.

Not infrequently, a machine developed for a small market bears a price to the customer in which a dominant factor is the development cost.

We can certainly expect continuing transference of unit operations, now carried out by hand, to machine functions. But there is the beginning of a new type of mechanization which suggests that, in some types of processing, a photograph in 1999 will show aggregations of complex machines operated from complex control panels but tended by relatively few workers.

These developments, which are just starting, of selective sensing elements, coupled with the "feedback" concept to control systems, open the possibility of automatic or semi-automatic processing plants.

QUALITY AND COST CONTROL

The interrelationship of science, technology, and food engineering to the technical success of food production was the topic of a paper by William R. Johnston and Lawrence Atkin, The Fleischmann Laboratories, and the paper was presented by Dr. Atkin. The following are pertinent points made in this paper:

If science is defined as comprehensive knowledge of the basic properties of matter and energy–and technology is defined as the application of that knowledge to products and processes–then food engineering can be described as the art of integrating both science and technology in practical food production.

Technical success in food production is achieved through the technical control exerted by the food engineer. He depends on objective and subjective functional evaluations to measure quality and efficiency. And he is able to draw on an adequate science and technology to maintain or advance the margins of quality and cost established by management.

This conclusion is based to a large extent upon the observation that an evaluation of product performance–*i.e.*, a functional evaluation–is both used as a highly significant part of the measurement of technical success and as a vital part of the control system operated by the food engineer. Science and technology play a dominant role in the interpretation of the performance test results and thereby provide the food engineer with the "know how" necessary for control.

The final functional evaluation of a food or food component thus provides a base from which to view the interrelationship of science, technology, and food engineering to technical success in food production.

Broadly speaking, technical success in food production is achieved when a basic manufacturing process has been developed to the extent necessary to enable production of a quality product at minimum cost. Having defined technical success in food production, we have next to consider objective methods of measuring it. This clearly requires a gaging of quality and cost.

The cost is easily measurable in dollars and cents, but quality is another matter. The measurement of quality by objective or subjective means is one of the key problems in successful food manufacture, and is particularly important when competition is energetic and resourceful.

Although technical success does not demand perfection, it does demand an ability to maintain with minimum tol-

erance the standards of quality and cost established by management. This means that the food engineer (regardless of his title) must be able to quickly pinpoint the source of the imperfections and translate his comprehension into instructions, which, when effectuated, will maintain the desired standard of quality. In other words, he must be in control of the process.

It is apparent that if technical success is to be achieved, the food engineer's interest and responsibility cannot stop at the point that the product leaves the factory.

It is probably safe to generalize that every variable attribute of the product, detectable to the consumer, must be subject to control by the food engineer. Lacking the know-how for control, he must refer to research to provide the needed information.

The call upon research for information at this point epitomizes the relationship of science and technology to food engineering. The fullest possible knowledge of all the component parts of the food, their chemical and physical nature, and their interaction under the conditions of processing, storage, and use is a prerequisite to adequate control. Any deficiencies in this knowledge are sooner or later disclosed by the inability to control some attribute of the product. And if a competitor should possess the missing information, the margin of equality or cost will be in danger.

The extent to which science, technology, and food engineering are utilized for control ultimately will determine the degree of technical success achieved. This requires adequate appreciation by management of the inter-relationship of science, technology, and food engineering, men trained in all three, and the physical facilities to effectuate their coordination.

OPPORTUNITY TO BOOST PROFITS

The relationship of the food engineer to food industry profits was analyzed by Raymond Stevens, vice president, Arthur D. Little, Inc. And here are some of his significant comments:

The industry may well prove to be on the verge or in the midst of a great expansion in the use of food engineers such as the petroleum industry experienced when it discovered chemical engineering and when chemical engineers began to realize the opportunities it offered them.

In the food plants processing traditional foods, the opportunities for research and food engineering may not be as obvious as in the newer industries built on recent advances in the physical and chemical sciences. Nevertheless, the opportunities are there.

Engineering plays a dual role in the industry—it shares with research scientists their responsibility for creative work, for improvement of quality, and for the maintenance of quality. At the same time, engineering shares with financial and accounting personnel the quantitative aspects of management. Engineering contributes constructively to both research and managerial practice.

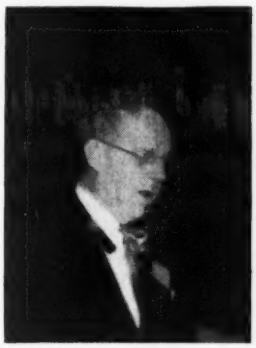
We are breeding a nation of gourmets. A critical consumer means opportunity. Demand for quality by millions of gourmets can be met only by well-engineered, well-managed production and distribution. Well-managed, alert companies have an opportunity to establish and maintain their position against irresponsible, unstable, cost-cutting competition. With volumes large and unit prices high, even minor improvements and precision in quality standards and uniformity pay dividends.

With quantity, convenience, and high quality available, price becomes important. And low cost, high volume is a matter of engineering. An engineer has been defined as a man who can do for one dollar what anyone can do for ten. Profit margins will continue to narrow with competition, and good food engineering will increase in significance. With an intelligent combined team attack on improving quality and reducing cost, great markets and great profits are possible.

A small company should hire one or more science or engineering graduates—even, if necessary, for production or sales positions—and then look to them for liaison with the world of science, research, and technology. They will help use effectively the enormous aid available from the supply companies—the manufacturer of equipment, of raw materials, and even of containers. Through such men the whole domain of current research can be tapped by even the smallest company.

To a greater degree, modern management of larger com-

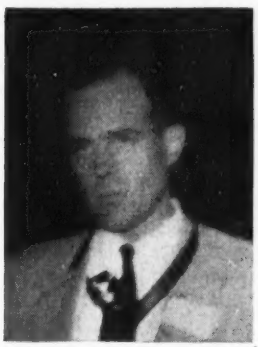
INSTRUMENTATION panel. Left to right: Lyle M. Richardson, Foxboro Co.; Ernest C. Clement, Mars, Inc.; J. G. Ziegler, Taylor Instrument Cos.; Chairman Curtis E. Maier; and Wm. J. Scarlett, Minneapolis-Honeywell Regulator Co.



Scarlett: *Variables must be integrated*

Ziegler: *Do more with present instruments*

Clement: *Let brain control many machines*



Richardson: *Too little understanding of control*

panies looks to its engineers to establish effective liaison with the many sources of aid, including the universities, the machinery builder, the supplier of materials and containers, and outside institutions generally.

Great advancements come from the outside. Certainly no one company can now do all its new development, and it may well ask of its technical staff that it place special emphasis on establishing effective "international" relationships in the world of technology.

It is the engineer's business to know good design and best practice. It has been said that a canner can be excused for not scrapping an old blancher—but not for failure to give that blancher the benefit of best modern practice. Similarly, there is no excuse for purchasing food processing equipment that is obsolete. It is a small food plant, indeed, that cannot employ engineering aid for protection against such drains on profits.

Around and through the industry, not too carefully hidden and readily available to a trained food engineer, is an enormous amount of unutilized know-how. It is a gold mine that can be tapped by the proper combination of entrepreneurial sense and competent food engineering. Fortunately much of it can be used without elaborate expensive programs or heavy investments, but the training, experience, and awareness of the special characteristics of the industry possessed by the food engineer are requisite.

Few, if any, of these improvements have been exploited fully by the food industry. Here remains an enormous reservoir of opportunity in the country's greatest industry, a reservoir of opportunity for service by the engineers and for profit by the entrepreneurs that back them.

We need more food engineers and more food industry companies employing more food engineering profitably. The food industry should then show a higher margin of profit, and the public get yet greater convenience, lower cost, and better food.

CUTTING PREPARATION LABOR

Engineering aspects of food preparation in the canning industry were analyzed in a paper by Alan Richardson, manager, Technical Advisory Service, California Packing Corp., and Bruno Pilorz, formerly operating manager of that company's canned foods division. Here are pointers from this paper, which was presented by Mr. Richardson:

The direct cost of hand labor in preparing fruits for canning amounts to 30-70% of the total labor cost of the whole canning operation. This cost increment for hand labor in vegetable preparation is somewhat less, percentage-wise, but still very substantial.

Twenty-five years ago, when the pitting of cling peaches was done by hand, this operation cost about $4.20 per ton at the then prevailing wage of 33¼¢ per hour.

If pitting were still done by hand, at today's wage of $1.32 per hour, the cost of this operation alone would amount to over $20 per ton. Instead, with mechanical peach pitters and mechanized handling, it is done for about $5 per ton, because the out-turn per worker is about four times as high as that of the hand operation.

In the preparation of pears, a similar situation prevails.

Obviously preparation costs will be further reduced for both of these items when automatic feeding devices for these machines are perfected.

These developments have also tremendously increased production. In most canneries today it would be utterly impossible either to secure, or to provide adequate facilities to use, the hand labor that current production would require without these machines.

Not many years ago a plant that turned out 20,000 cases in 24 hr. was outstanding. Today, there are a number which exceed 100,000 cases.

Present labor costs offer an attractive field for engineering effort to be directed toward the development of automatic feeding devices for these machines. Another and even more challenging assignment for the engineer lies in the development of machines to replace visual inspection and sorting of fruits and vegetables.

Substantial progress has been made in the development of electronic devices which will objectively classify fruits and vegetables on the basis of increments of color difference much smaller than the human eye can detect. This far the problem seems deceptively simple. However, much development work must be done before such devices can be used extensively to replace visual sorting operations in the cannery.

When such machines are perfected, the upper limit of their capacity will definitely be based on the mechanical rather than the electronic functions of the devices.

Automatic trimming for blemishes, etc., may well be the next step. Such machinery will necessarily be intricate and highly specific in function.

Industrial television already has found application in other industries and it may well become a tool for implementing and centralizing quality control of goods in process in food plants. This might well prove to be one of the most useful industrial applications for color TV when and if it reaches the stage where industrial applications are feasible.

Mechanization of food preparation still presents the most economically important area for engineering research and development, regardless of how final preservation of the product is effected.

ADVANCES IN EVAPORATION

Evaporation in the production of major foods, an operation of increasing importance, was reviewed in an engineering paper by Vernon C. Praschan, Clinton Foods, Inc.

Stress was placed upon the effect on quality and nutritional factors and on the trend to stainless alloy metals in evaporator construction. Cast iron and steel are not suitable for most fruits and vegetables because they cause product darkening and flavor instability. And very minute amounts of copper pick-up by citrus juices destroys vitamin C.

Need to avoid localized overheating in evaporators and the importance of a low temperature differential at the heat-transfer surface were emphasized. Design for easy cleaning is another essential.

Mr. Praschan discussed the different basic types of evaporators and their advantages and shortcomings. He mentioned a case in which a rising-film unit was converted to a falling-film type to double the time between boil-outs and greatly reduce down-time. He also described an advanced type of evaporator in which the heating unit is separate from the evaporator column to curtail caking on the evaporator tubes.

HIGHER PACKAGING EFFICIENCY

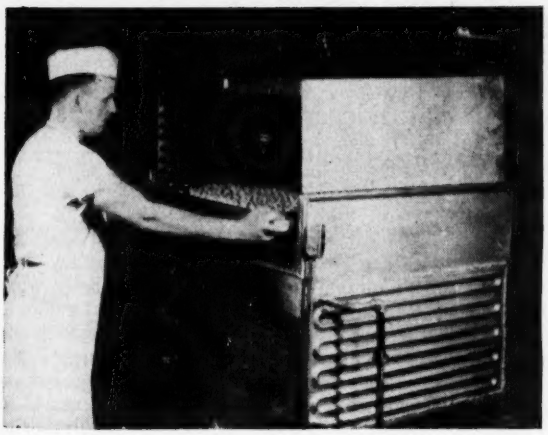
Engineering aspects of food packaging were presented by Laurence V. Burton, executive director, Packaging Institute. Some of his comments follow:

Engineering of the package itself always calls for the application of the principles of physics. It may frequently also call for the application of the principles of chemistry in the development of food packages. Also, at times, it calls for microbiology, and occasionally, for biology when rodents and insects are involved. But in all cases, it calls for a broad-gage viewpoint and lots of engineering common sense.

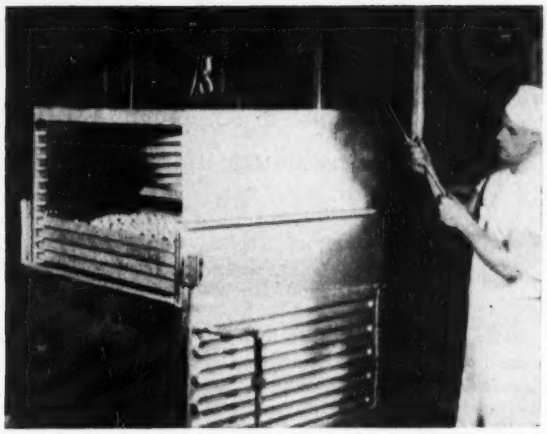
Engineering the food packaging operation calls for the application of all the foregoing sciences, plus that

(*Turn to page* 136)

Simple 1-2 of Sugar-Crystallizing Confections



FIRST: Trays of candy centers are slid into position in rack that is suspended over specially designed crystallizing vat. Serpentine panel on side of tank is built-in plate-type coil. Another is in bottom of tank. One is for heating syrup, other for cooling.



THEN: Rack of tray-loaded centers is lowered, with aid of chain hoist, into tank of syrup for sugar-crystal coating of candies. Tank also serves as storage unit for syrup, which is heated to redissolve sugar crystals and then cooled, ready for another batch of centers.

Boosts Sugar-Crystal Coating 50%

Candy maker's improved system of crystallizing mint centers features mechanization sparked by specially designed tank with built-in heat-transfer units. Others might explore the benefits

E. F. WEADICK

District Manager, Fanny Farmer Candy Studio, Harrisburg, Pa.

Using the conventional method of crystallizing mint centers, our Fanny Farmer Candy Studio at Harrisburg, Pa., had, you might say, taken three called strikes—space, time, and labor.

Even so, our inning wasn't over by any means.

As for the routine that had us whiffing, it went like this: We placed about 2½ lb. of centers in 8x12-in. galvanized metal pans, with ¼-in. mesh screens above the candies. Pans were arranged in long rows on tables, thus gobbling up considerable valuable floor space in our studio. Then, using a dipper, one of our candy makers covered the centers with 34-deg. Bé sugar syrup, going from one pan to the other. Following slow, overnight evaporation, sugar crystallized from the syrup and onto the centers.

Crystallizing Simplified

But now the situation is changed. Today we're really "batting them out."

This fresh start followed the recent installation of our specially designed crystallizing tank, featuring a pair of Platecoil heat-transfer units. (Tranter Mfg., Inc., Lansing, Mich.)

New method of crystallizing centers has enabled a great slash in the space, time, and labor formerly required.

We figure that our present method of making crystallized mints has stepped up production approximately 50%.

Further, we've chalked up three other benefits: (1) More uniform quality confections are turned out; (2) operations are more sanitary and orderly; and (3) maintenance costs have been cut to an absolute minimum.

Today, about 360 lb. of centers are coated with crystallized sugar in the 36-in. square tank within only 3 hr. And now the tray-loaded centers, inserted in a dozen-shelf metal rack, are immersed in the syrup tank with the aid of a manually-operated, small chain hoist—a simple task that abolishes the former messy, multiple syrup-dipping operations.

The galvanized iron tank holds 40 gal. of room temperature, 34-deg. Bé syrup, which is sufficient for a rack containing 24 trays (bottoms with ¼-in. mesh screen). Each tray holds about 15 lb. of centers.

Welded to the bottom of the tank by our maintenance men was one of the plate-type coils, with the other panel coil on one side of the tank. Bottom unit employs steam for heating syrup, while cold water circulates through the other for cooling.

Each plate-type coil comprises a pair of embossed panels of cold-rolled steel, welded together to provide channels for passage of heating or cooling media. Steam or cold water easily flows through the serpentine embossing to make the entire unit a prime heat-transfer surface.

Transfer Abolished

Use of Platecoils as integral parts of the tank design has eliminated the need to transfer syrup from tank to a kettle for heating to redissolve sugar that crystallizes after the second day. Then, too, the cooling operation is cared for.

In this way, too, syrup is re-used. Syrup level in tank drops about 1 in. each day, and sufficient fresh syrup, made up in a 40-gal. steam-jacketed kettle, is introduced to make up for this loss.

Latest Machines for Packers

28 innovations in equipment exhibited at National Independent Meat Packers show — including units for packaging, grinding, curing, slicing, forming

PACKAGING machines received notable emphasis at the recent NIMPA exhibit of machines in Chicago. Of the two-dozen-and-more new equipment pieces displayed, ten were advanced packaging machines.

These were specially designed as low-cost units for the small packer of sliced luncheon meats, wieners, boneless meats, and chub-type items. They were constructed for higher speed, and tighter and more attractive packaging.

Talked about, but not displayed, was the new Kartridg-Pak machine for chub-packaging sausage-meat products and meat-sandwich spreads in 4-, 6-, or 8-oz. units. Machine takes a flat roll of plastic film, shapes, seals, fills, and completes package with metal clip.

Interesting were a coder for imprinting lithographed cans, two scales built into a luncheon meat slicing-stacking line, and a sausage-stuffer scale for weighing 55-ft. lengths of weiners.

New pickle-injecting machines continue to make their appearance. Significant here was a brand-new unit for alternate use of vacuum and pressure for rapid combining of pickle with meat protein. Vacuum (almost 30 in.) expands blood vessels and muscle cells so that they more readily receive pumping pickle. For example, hams when vacuumized, expanded to 1½ times their original volume.

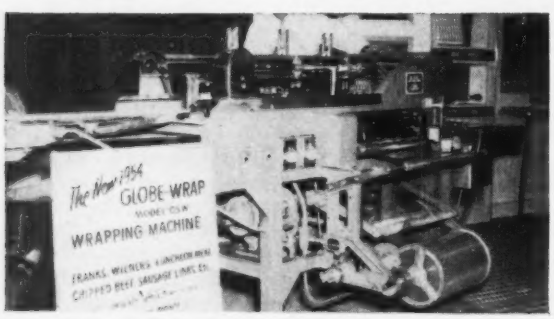
Attention-catching was a new frozen meat or fish slicer and a hamburger unit that makes 2,100 patties per hour. Also notable was a versatile skinless-pork-sausage former. Using interchangeable molds, machine forms meat, including fish items, into various shapes—rectangular, cylindrical, square, or loaf. Special device also slits paper at one or several places to accommodate product to be packaged.

A simple salt dissolver was shown. Unit has needle valve for controlling amount of salt dissolved from salt blocks for brine-system use. Also on view was a sanitary, economical traveling tray-type oven built in two parts for easy shipment and reassembly.

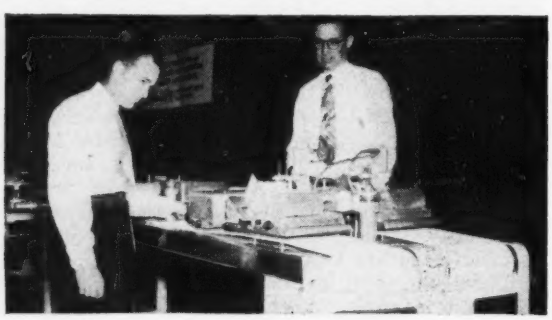
Noted was use of longer-wearing parts and self-contained, better lubricating systems on certain heavy-duty machines. Parts readily come apart for easy cleaning, and corners and crevices are abolished. Safety devices are stressed.

10 NEW PACKAGING UNITS:

Emphasis on low cost, semi-automatic units . . . wrappers, sealers, labelers, coders, scalers, and packing lines

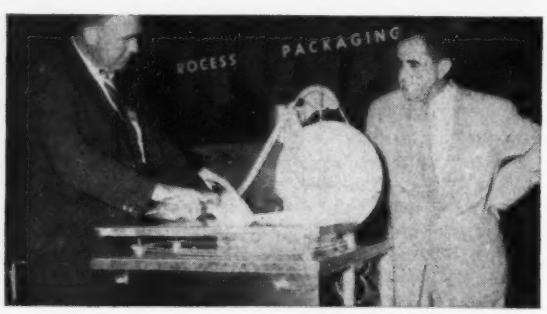


WRAPPER handles 50-70 packages per min. Unit provides ideal, tight, smooth wrap for franks, luncheon meats, chipped beef, or any cartoned meat product. Manufacturer: The Globe Co., Chicago. (86A)



DUAL labeling attachments on wrapping units comprise vac pick-up cups for magazine-fed, thermoplastic labels and sealing plate over belt. Rate: 60/min. for each.—Miller Wrapping & Sealing Mach. Co., Chicago. (86B)

PACKING LINE attached to luncheon-meat slicer has two scales and Neoprene belts. Girls take shingled slices from top belt, count in double-stack trays, check-weigh, then feed meats to lower belt going to wrapping unit.—Allbright-Nell Co., Chicago. (86C)



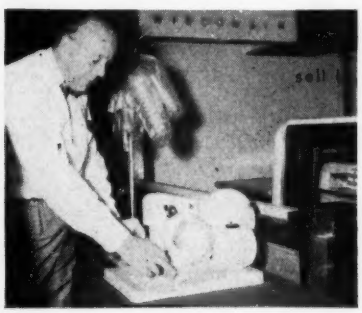
SEMI-AUTOMATIC CRYOVAC unit vacs and twists bagged items on rotary nozzle. Twist part of bag transferred to jaws of clipper and pulled up to cut-off knife to remove excess bag end. Rate: 20 per min. Maker: Dewey & Almy Chemical Co., Cambridge, Mass. (86D)

COMBINATION semi-automatic carton-former and product-weighing time-saver for make-weight type packaging. Speed: 150/hr. wallet-packs — Oster Tool & Die Corp., Chicago. (87A)

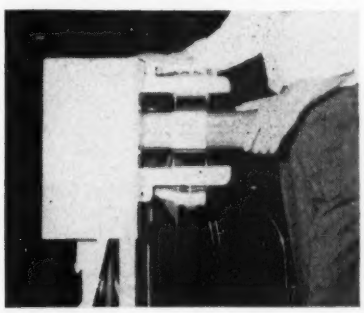
CLOSURE unit compresses boneless products stuffed in fibrous casings. Abolishes surface wrinkles and air pockets. Displayer—Vac-Tie Fasteners, Elizabeth, N. J. (87B)

PAK-FORM-R unit consists of plastic forms to double-layer stack, check-weigh, then transfer frankfurters to wrapping. Displayer—Great Lakes Stamp & Mfg. Co., Chicago. (87C)

SAUSAGE-STUFFER scale enables packer to check-weigh 55-ft. lengths of stuffed casing in arriving at 10-wiener-per-lb. weights. Maker: Exact Weight Scale Co., Columbus, O. (87D)

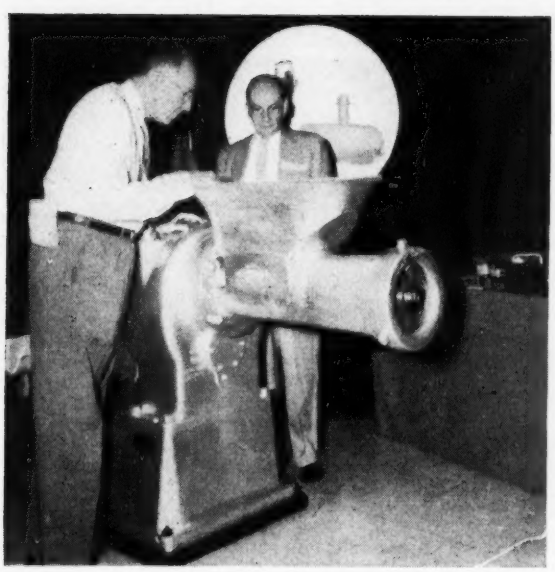


CHUB SEALER comprises finger-tip operated lever for feeding aluminum tape from roll and crimping tape to casing. Maker: Tipper Tie, Inc., Union, N. J. (87E)

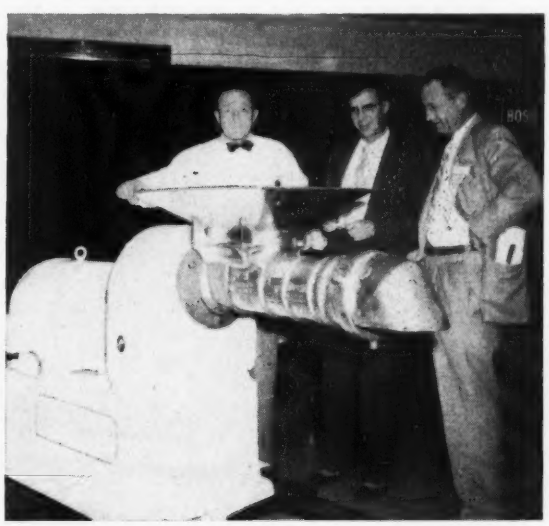


CODER imprints ingredient listings on lithographed cans. Saves storage space and can inventory. Simple change-over. Exhibitor: Oster Tool & Die Corp., Chicago. (87F)

2 MEAT GRINDERS: Stress on longer wearing parts, improved lubrication and product feed, better safety and sanitation



SANITARY-DESIGNED grinder features rapid safety feed, new helical-gear transmission, adjustable tapered roller bearings, and alloy steel socket shaft. Displayer: Allbright-Nell Co., Chicago. (87G)



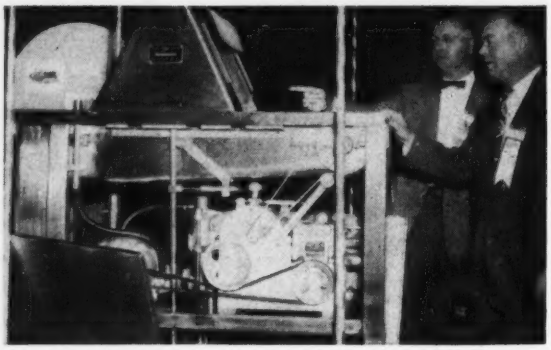
IMPROVED GRINDER consists of super-feed cylinder and screw; newly designed helical-gear-reduction unit, driven by 40-hp. motor; and sight glass oil indicator. Maker: Cincinnati Butchers' Supply Co., Cincinnati. (87H)

Turn page for more units →

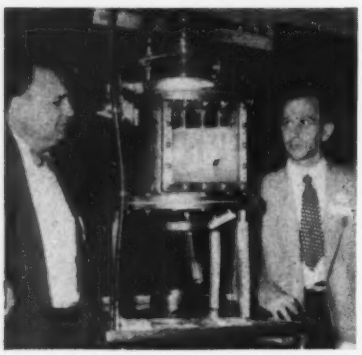
4 CURING UNITS, 1 SALT DISSOLVER:

Latest innovations in pickle-injecting, meat curing, salt dissolving

PORTABLE, stainless steel pickle-injecting machine has 26-in. wide feed-table and 18 injecting needles. Motor (1½ hp.) pumps pickle and activates needles.—Cincinnati Butchers' Supply Co., Cincinnati. (88A)

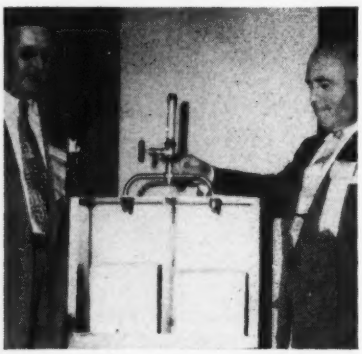


PICKLE INJECTOR (1-hp. motor) designed for medium and small production (4-5 bellies per min.). Floor space: 23x54 in. Product size: 4x16 in. Injection: On 1⅝-in. centers.—The Allbright-Nell Co., Chicago. (88B)



MEAT-CURING unit uses alternate vacuum and pressure for quickly combining pickle with meat protein. Meats then move directly to smokehouse or cook tank.—Geo. Leisenheimer Co., Brooklyn. (88C)

ATTACHMENT to pickle-pump base has 6 stitch-type needles and hand-operated valve for injecting boneless cuts. Needles guarded by rubber fingers. Exhibitor: Preservaline Mfg. Co., Flemington, N. J. (88D)



DISSOLVER for economical, controlled utilization of salt blocks (Kooler Kubes) in brine systems. Cuts cost of salt, maintenance, and equipment replacement: Displayer: International Salt Co., Scranton. (88E)

2 SLICING MACHINES:

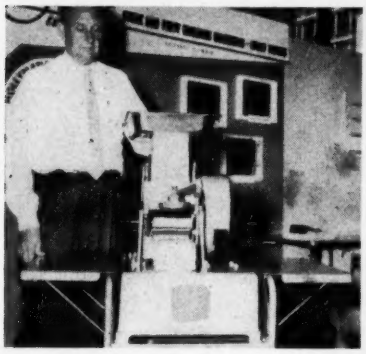
One cuts frozen meats and fish products. Other is an automatic cold-meat slicer-scaler unit

AUTOMATIC unit slices, in 3/16-in. thickness range, frozen meat or fish at speed up to 60/min. Guard protects operator from hazard. Fully enclosed, sanitary unit has removable panels. Magnetic brake stops blade when no more meat to cut.—General Machinery Corp., Sheboygan, Wis. (88F)

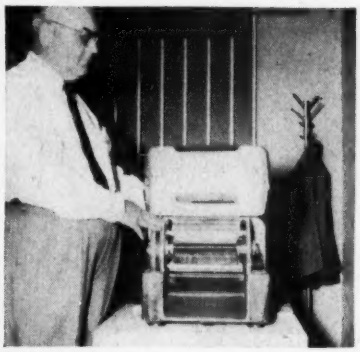
SCALERS (2) are built into automatic slicing line. Stacked meat slices from two loaves are conveyed to commodity platters of over-and-under scale. Weighed stacks are automatically pushed onto packing-line belt. One girl checkweighs two scales to control slice thickness.—U. S. Slicing Machine Co., La Porte, Ind. (88G)

MISCELLANEOUS:

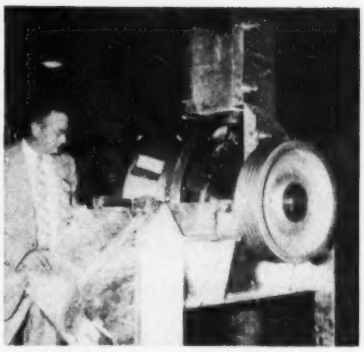
Featured are patty former, tenderizer, shredder, oven, purifier, dehider, pressure-packer, hasher



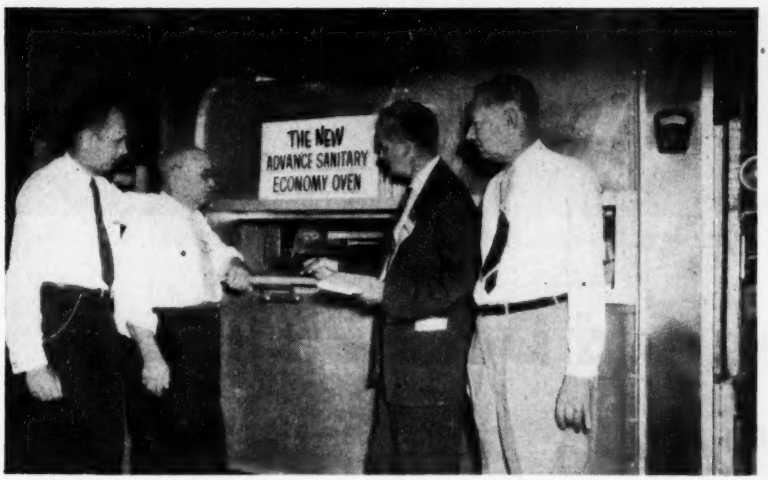
FORMING UNIT turns out 2,100 patties hourly. Features plastic-reinforced glass-fiber parts and automatic patty-paper feed.—Hollymatic Corp., Chicago. (89A)



TENDERSTEAK machine has newly designed knives of greater cutting area, with self-aligning stripper following blades.—U. S. Slicing Machine Co., La Porte, Ind. (89B)



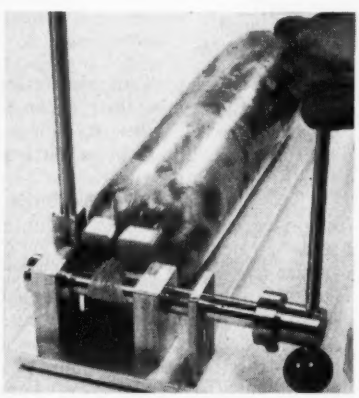
SHREDDER for frozen meat blocks has removable, hinged-top, vertical feed chute for easy steam-cleaning. Maker: Cincinnati Butchers' Supply Co., Cincinnati. (89C)



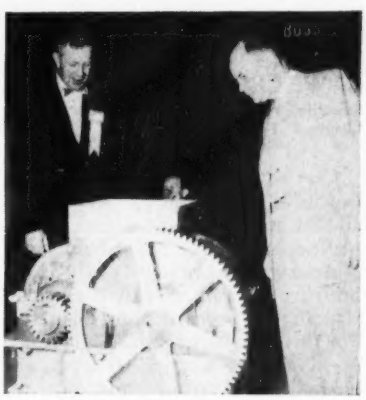
SANITARY, low-cost oven (revolving tray-type) is built in two pieces for easy assembly. Base pan is on traveling track for simple cleaning. Trays are stabilized to avoid swinging. Rock-wool insulated oven is of heavy-gage aluminum. Unit has automatic temperature controller, electrical ignition, and safety devices.—Advance Oven Co., St. Louis. (89D)

LINE-TYPE purifier is designed to remove solids (impurities) from live or exhaust steam, compressed air, and vapors. Exhibitor: V. D. Anderson Co., Cleveland. (89E)

LONGER LIFE is built in this dehider, through hollow-ground blades, newly-designed bearing assembly, and flexible driving shaft (enclosed in rubber casing).—Globe Co., Chicago. (89F)



MANUALLY-OPERATED Pressure-Pak Midget machine tightly seals end of casing-packed boneless products with circular metal closure head.—Irving Mach. Co., Philadelphia. (89G)



LARGE 43-saw hasher-washer minces soft raw materials prior to rendering. Capacity: Full pecks as entrails are available.—Cincinnati Butchers' Supply Co., Cincinnati. (89H)

ADJUSTABLE to any truck-bed height, powered ramps greatly simplify loading and unloading operations.

Mechanized Dock Ramps *And How to Pick Them*

Quickly matching dock to truck levels, they speed jobs, cut labor, up safety . . . Handy guide-list gives features to check in gaging units

C. W. CHOROMANSKI
Executive Vice-President, Rowe Methods, Inc., Cleveland

One of the most troublesome and expensive areas in cargo handling lies at that strategic point where loading platform and truck bed fail to meet.

Among the various methods of bridging this gap, we may cite as outstanding the powered adjustable ramp. For this equipment provides increased speed of operations, greater safety, and reduced labor.

The problem stems, of course, from the fact that modern trucks and trailers are made in a variety of models wherein bed heights vary considerably. Some shippers have averaged the bed heights of vehicles commonly serving them and then built their docks to that average level. Even so, bed and dock sometimes "miss" by as much as 14 in.

What's more there is the further frustrating factor that bed height of the *same* truck can vary, according to whether it is lightly or heavily loaded. Here, one must conjure with the characteristics of pneumatic tires and massive springs. True, they've done wonders in the battle against shipping damage. But they've also greatly complicated the problem of truck-to-dock cargo transfer.

Most common device for crossing the space has been the simple bridge plate. Steep slopes, however, hobble its efficiency, since loadings of manually-propelled trucks must be modified when a grade is encountered.

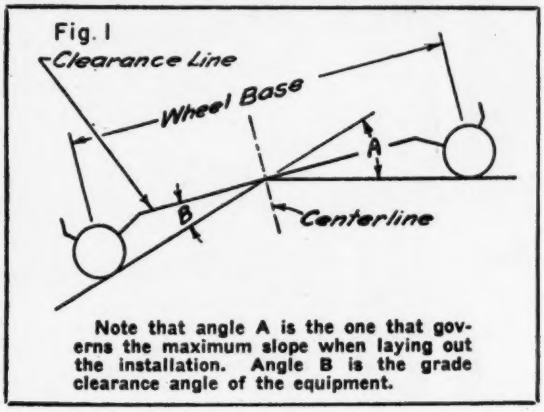
The slope can be reduced by lengthening the bridge plate. But such added length calls for extra strength, tending to make the man-handled plate much too heavy and bulky.

Height Adjustable

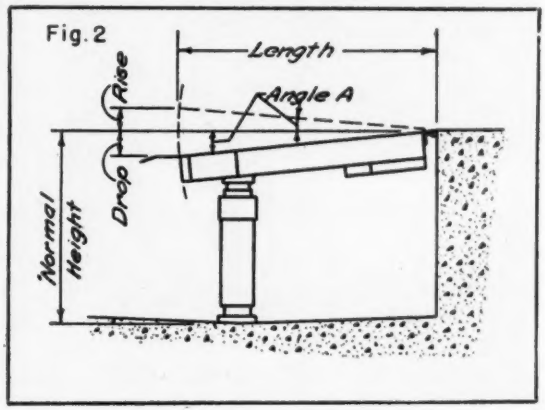
The conventional limitations don't affect the powered adjustable ramp. It may be regulated to any required height. And it makes greater lengths and gentler slopes feasible because of its powered operation. Deck of this type ramp is engineered to move up and down while holding a full load. A hinged bridge plate is fitted at the forward end.

The angle-of-slope figure to be used in determining required deck length of the powered ramp is governed by the wheelbase and under-clearance of

(*Turn to page 167*)



Note that angle A is the one that governs the maximum slope when laying out the installation. Angle B is the grade clearance angle of the equipment.



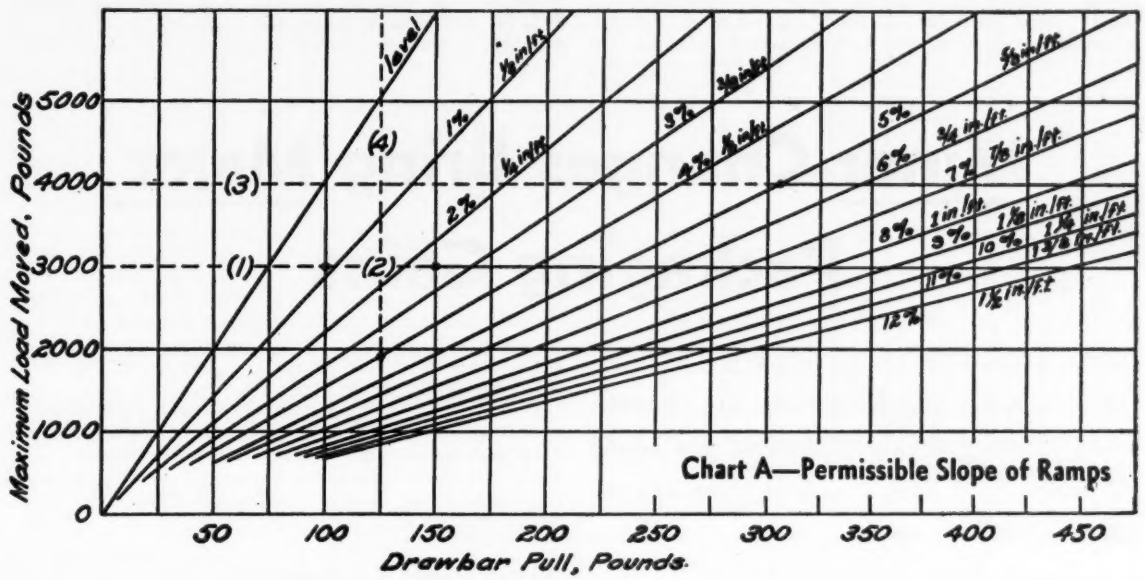


Chart A—Permissible Slope of Ramps

Here's Way to Figure Ramp Angle, Length and Slope

In choosing an adjustable ramp, first step is to determine (Fig. 1) the maximum bridge angle for the handling equipment to be used. Proceed as follows:

Draw equipment's outline so that center (marked centerline) of its clearance line touches at point where hinged bridge contracts level loading platform. Then draw a line from this point tangent to bottom of lower wheel. These lines form the grade clearance angle (B) of the equipment. Twice this angle (B) represents the maximum permissable bridge angle (A) for this equipment.

Now, to determine the length of bridge. It must be long enough (Fig. 2) so that each angle (A) below and above the level line will be less than the angle (A) clearance limitations noted in Fig. 1. Also observe that the longer the length of bridge, the greater will be the load that can be accommodated within the limitation of drawbar (or pull) power. The lower the mover's power, the more gentle must be the ramp slope.

This slope can be computed readily with the aid of Chart A. Here, drawbar pull is at 100% efficiency.

An added power margin may be required if floors or equipment are not in good condition. With mechanical power, there should be an additional reserve. By entering the chart with maximum weight of load and effective drawbar pull, slope requirements may be determined.

Solutions to four typical problems (scribed on chart A):

1—Find Maximum Grade:

Given: Truck and load weight, 3,000 lb.; drawbar pull, 100 lb.

Solution: Enter Chart A at left on 3,000 lb. and follow along scribed horizontal line until it intersects 100-lb. vertical line. Indicated capacity shows power sufficient for handling on level.

2—Find Maximum Grade:

Given: Drawbar pull, 150 lb.; load weight, 3,000 lb.

Solution: Again enter chart at 3,000-lb. line and move right horizontally until to 150-lb. vertical line. This point is between 2 and 3% diagonal slope lines. Grade of 2.5% is acceptable.

3—Find Drawbar Pull:

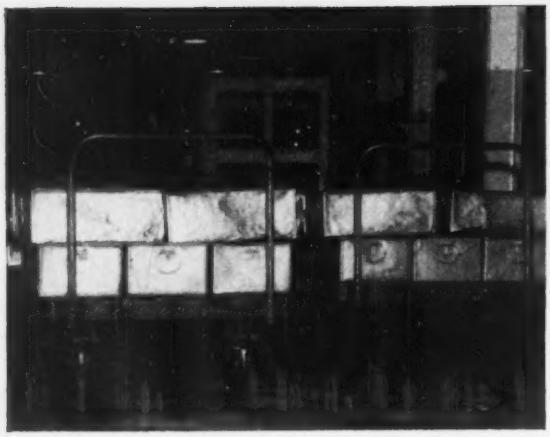
Given: Truck and load weight, 4,000 lb.; slope 5%.

Solution: Enter along 4,000-lb. line and follow horizontally to 5% slope diagonal. This is just beyond 300-lb. vertical line. Thus, about 310-lb. drawbar pull is required.

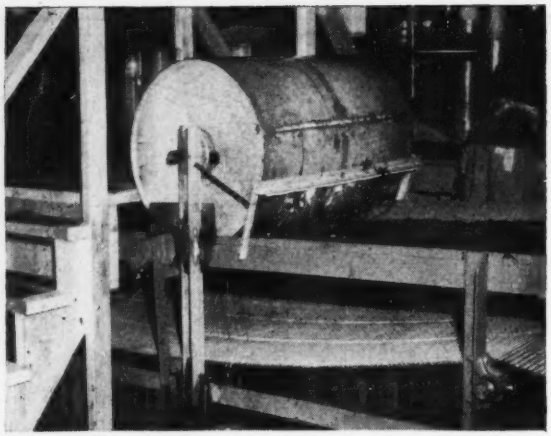
4—Find Maximum Load:

Given: Drawbar pull, 125 lb.; slope 4%.

Solution: Enter along 125-lb. line and move vertically until intersecting 4% slope diagonal. This is just below the 2,000-lb. horizontal line. Thus, maximum load is about 1,800 lb.



OLD metal tote boxes with perforated bottoms. They were inefficient in batch operation of draining excess water from washed spinach before chopping.



NEW water weighted rotating drum now continuously expresses moisture from spinach, thus assuring delivery of uniform drained weight product at filler.

Minor Changes Bring Major Packaging Gains

Uniform drained weight of packaged product is assured and operations are speeded when simple mechanical devices are added to frozen food line. . . . And costs are reduced into the bargain

FE STAFF

Efficiency of the chopped frozen spinach line at Seabrook Farms Co., Bridgeton, N. J., has been materially advanced through minor improvements engineered at little cost. Gained have been these four benefits:

- **Increased output per line**
- **Less loss of packages and less damage to carton former**
- **Assurance of uniform fill of packages**
- **Notable reductions in check-weighing requirements**

Here's the story of the changes made and results accomplished:

Until recently, the company's chopped spinach was prepared for freezing by conventional procedure. After washing and blanching, the product was placed in metal tote boxes with perforated bottoms, to allow surplus water to drain. These containers were then stacked on hand trucks to provide a supply of product to choppers when drained weight was reached. An Elgin plunge-type volumetric filler deposited chopped product into the folding cartons.

But a major difficulty was inherent in this method. Drained weight could not be controlled, since the time allotted for sufficient water to drip from the wet spinach could not be kept constant. During periods of interruptions in the packaging operations, tote boxes drained longer than when packaging was treading on the heels of preparation. Also, drainage time was necessarily shortened to a minimum at the end of a shift if clean-up operations were to follow on time.

And so, filled weight continually varied. Thus, frequent adjustments of the fillers were necessary to compensate for variations in drained weight. Most objectionable and costly element resulting was the need for 15 check-weighing stations and similar number of weighers to assure accurate fill of all cartons.

Drained Weight Now Constant

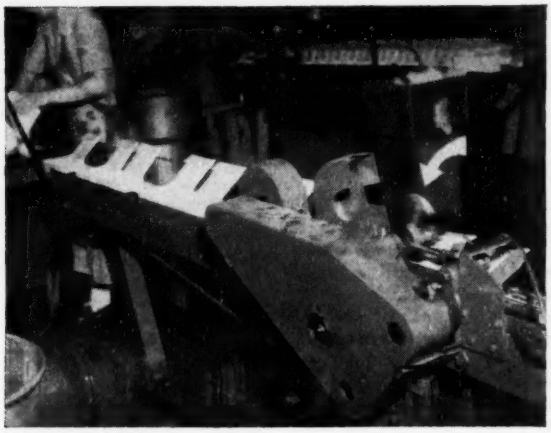
Simply constructed unit that now makes sure of controllable, uniform drained weight to choppers and fillers is a sheet metal drum. Shaft of this hollow cylinder is lowered between a pair of angle iron uprights located on either side of the conveyor that transports the wet blanched spinach to the choppers. With this arrangement, the drum rides on the woven wire belt of the conveyor and rotates at the same circumference speed as the linear travel of the conveyor belt rolling over the product layer with uniform pressure to expel excess water.

Through a hole in the end of the drum placed near the shaft, water may be added or withdrawn to vary the pressure that expells excess water from the wet spinach. This method of changing drum weight provides one means of controlling drained weight at the filler. Another control is the variable speed drive of the conveyor unit, and a length of woven wire on which product continues to drain enroute to the choppers.

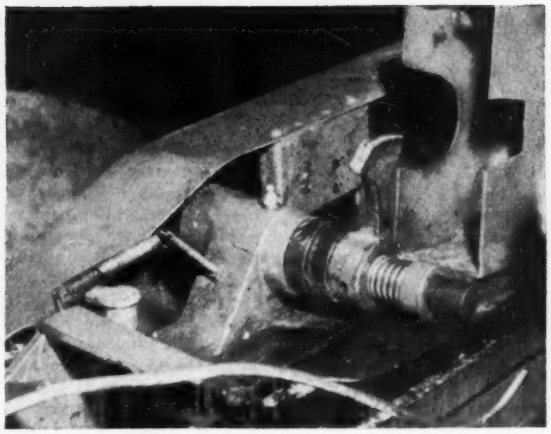
Old tote box method accordingly has been abandoned and manual labor required by this drainage method is thus avoided.

Since drained weight of chopped spinach delivered to fillers is now uniform, fill is likewise constant. Therefore, check-weighing has now become merely a matter of quality-control—one worker being ample for the responsibility that formerly required 15 workers.

Machine-opened folding-cartons, into which chopped



PACKAGE LINE operation was speeded by slip-clutch arrangement (arrow) on carton-opening machine.



CLOSE UP of clutch. It avoids bent shafts, broken chains, and damage to carton-opener (see sketch below).

spinach is volumetrically filled, are delivered to the forming machine from a magazine feed. One operation in the shaping of the package is performed by a rotary arm, which raises carton sides upright.

All too frequently, when the opening operation would go astray, jammed cartons would pile in a mass between the rotating arm and the next forming unit. Then something had to give.

Whether a shaft was bent or broken, a chain snapped or setscrew sheared, maintenance was demanded, production time lost, output cut.

Though all jamming has not ended, machine parts are no longer threatened. Now, interruptions resulting from a carton jam are but momentary—readily cleared by the machine operator.

Devices That Smoothed It

The shaft driving the rotating arm was replaced by one of longer length. To this was secured a collar with a $\frac{1}{8}$-in. V-groove milled radially into the outer surface. Next to this collar was placed a similar unit that is free on the shaft and to which the rotating arm is welded.

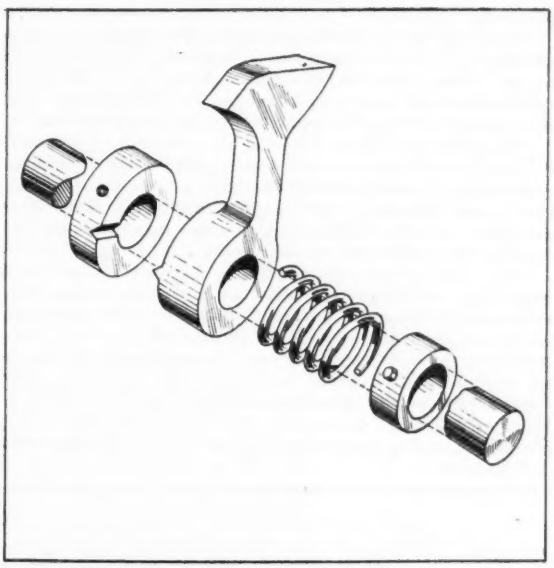
On one face of the latter collar a V-projection was then milled to fit the groove on the first collar. Male projection is held in the female notch, engaged clutch-fashion by tension of a coil spring, backed up by a washer on the near side and a third collar which is setscrew-anchored to the end of the drive shaft.

There is now ample force behind the rotating arm to perform its function. However, in event of a jam, the shaft continues to turn, though the arm is stationary against the jammed carton. Only pressure exerted is that from the coil spring.

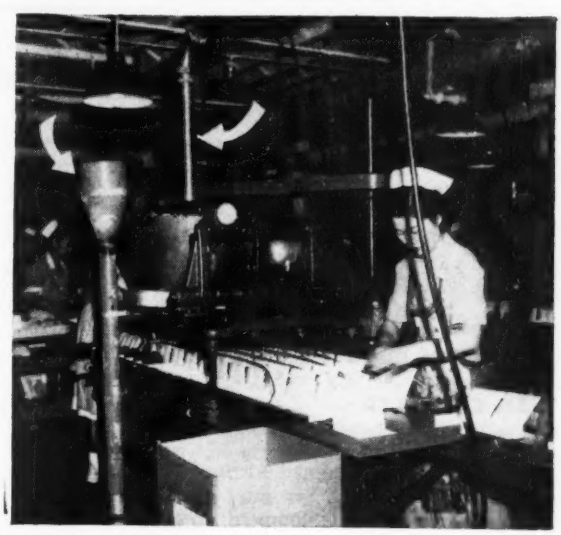
Cleanup Speeded

At the end of a shift, filling machine bowl is emptied of chopped product to supply the last of the cartons. Then cleanup starts. Formerly the feed line had to be cleared and cleansed via the filler hopper before the washing and sterilizing of the filling machine could start.

Now, without interruption of filling machine cleaning procedure, the drop sections of each of the feed pipes from the choppers are swung over the funneled top of a permanently installed pipe leading to a waste flume. This permits separate and simultaneous sanitary operations on feed pipe and filler, thus considerably reducing clean-up time.



CONSTRUCTION DETAILS of the new safety slip-clutch.



STATIONARY drain and swing pipe speed cleaning. They permit simultaneous pipe and filler cleaning.

FOREMOST LEADERS TELL

Frank H. Irelan

General Manager, Delco Products Div., General Motors Corp.

"I BELIEVE in the National Assn. of Foremen because, through actual experience in helping to keep this organization alive since its early days, I can report that the return on my investment, for time and energy spent, has been very much worthwhile, indeed, not only for me personally, but for the company with which I am associated.

"In organizing after World War I, the NAF afforded certain management people, who were interested in production problems, and had worked together closely in war times, a means to get together and discuss common problems that contributed to a uniformity in decisions made on management problems.

"The NAF brought better understanding within the ranks of management, defeated the complacency and cockiness of top brass, and re-established confidence in the lower echelons of the management group in such fashion that they knew they were definitely a part of management.

"The NAF established a line of demarcation in industry, defining the duties for men representing labor and those representing management—cleared up the red-herring smell that foremen were neither fish nor fowl. This definitely proved Webster was right—that foremen are leaders, and leaders are management.

"The NAF sponsored leadership training and educational programs, covering the merits of our free competitive enterprise system, and paying dividends to every company whose management personnel participated.

"The power of a large national group has its influence on certain power-minded political representatives, who frequently are willing to discount the merit of the Free Enterprise System unless they see the threatening power of the votes of a large organization. It takes power to be convincing."

Charles F. Kettering

Director and Research Consultant, General Motors Corp.

"THE FOREMEN are the greatest single element of American industry. Look at it this way: In our country we have three distinct industrial advantages over any other country.

First of all, we have individual liberty. Here, you can quit your present job and get yourself another tomorrow. Second, we have mastered mass production. And third, we are the greatest tool and machine makers in the world.

"Well, the foreman is the one man in industry who is able to lump individual liberty, mass production, and toolmaking into a ball and do something with it. The foreman, through human relations, keeps workers happy and satisfied. Through his technical know-how and administrative ability he keeps the production lines flowing. And he knows how to make tools, also knows how to use them to the best advantage."

"We started the Foreman's Club movement in Dayton because our industry needed good foremen in order to survive. Probably it is just natural that all other industries found they could use the NAF, too.

"One of the most satisfying things about the NAF is that the basic philosophies and objectives have never changed since we started out in 1918. You know why? Well, I'll tell you: It is because people in industry have not changed psychologically. The NAF knows that. I know it. And probably you do, too."

Here's *Practical* Management

—Demonstrated for Decades by "Upgrading

More than 61,000 men in supervisory capacity in 1,500 organizations find NAF training keeps them abreast of the increasing demands of their jobs, also prepares them for advancement in the ranks of management

IVAN C. MILLER
Associate Editor, "Food Engineering"

For 36 years the National Assn. of Foremen, Management Men of America, has aided members in attaining job satisfaction as well as improved job performance. And it has also helped them to advance to higher levels of management and to assume increased responsibility.

Likewise, NAF has brought benefits to the members' companies, among them—

1. Separation of "first-line management" (foremen and supervisors) from union affiliation and locating them—*once and for all*—as a part of management.
2. Establishment of communication all the way up and all the way down.
3. Improvement in union-management relations.

Further, the organization has rendered invaluable service to business and industry at large, by protecting the threatened position of the management group and by aggressively fighting to preserve and to better the free enterprise system.

The title, the National Assn. of Foremen, adopted by the non-profit organization when it was formed in 1925, today is misleading. The training aids and other benefits provided to members are not limited to foremen—nor to any other group in management.

Listed among individual members are not only those

YOU THE "WHY" OF NAF

A. L. Freedlander

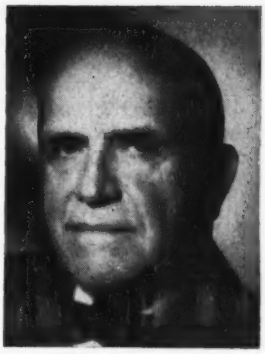
President, Dayton Rubber Co.

"I HIGHLY endorse the NAF because manpower is the measure of industrial strength. And I am deeply impressed with the way the National Assn. of Foremen has raised, and is raising, the standard of foremanship throughout the country. For it has given every member an opportunity for study, self-improvement, leadership, and faith in the unity that makes all America a strong hard-hitting production team—a truly democratic concept.

"Today we are faced with a real test of the principles of democratic freedom—the same principles that have been responsible for the great industrial advancement of our country, the miracles of mass production and the highest living standard in the world. These are the principles of foremanship.

"Never in our history have we been more disturbed by the forces attempting to disrupt the normal and economic laws governing our free American society. We shall be taxing to the utmost the strength and resilience of all of us to prove that our system can serve us for full prosperity.

I am sure that we, as Americans and as foremen, will meet this challenge. For only through increased production can we keep our country strong. And America must be kept strong and free. It is the creed and the tradition of all foremen in NAF to take up whatever gauntlet may be thrown down."



Louis Ruthenburg

Chairman of the Board, Servel, Inc.

"IT SEEMS to me that since its inception, the NAF has brought rich benefits not only to its members but to American industry generally. In my opinion NAF has been an important factor in preserving and in improving many vital features of our American free competitive system.

"Some time before 1918, when I met with a little group of 80 foremen in a Dayton YMCA to discuss more effective foremanship, I had dealt with and settled a strike. I was so impressed by the wastefulness of an unnecessary strike that I spent months in the shop to determine the real sources of unrest and of misunderstanding that lead to labor disturbances.

"It became increasingly evident that a major source of trouble was in relationships of foremen and the workers they supervised. It wasn't the foreman's fault. Top management had failed to develop the foreman's ability in the fine art of human relations. Usually, the foreman was doing the best he knew how without benefit of information and training.

"Out of this conviction, reinforced by hundreds of experiences in adjusting grievances in the shop, the early foremen-development program of Dayton developed.

"For 30 years the NAF has gradually spread its influence through increasing membership and through better understanding on the part of top management.

"It is fortunate that NAF was well-seasoned before American industry felt the growing pains incident to labor unionization. I believe that the stabilizing influence of sound foremanship has been the means of avoiding conflicts and wastefulness.

"From my viewpoint it is difficult to over-estimate the good that has been accomplished by NAF through the development and stimulation of sound management philosophy and practices on the part of U. S. foremen."

Training by *Proved* Methods

Inc."—The National Association of Foremen

in first-line management, but also staff officers—company presidents and other "top brass." This is all a part of the overall plan, since one basic objective of NAF is to unify all segments of management.

Another reason for top executive management membership in the association is that not a few of those who direct leading American corporations became members of the association when they were at the foreman level, and have retained not only their membership but continued their activity.

These business leaders largely attribute their rise to the training and the associations provided by NAF membership.

How and By Whom Started

Immediately after World War I, a group of 80 ambitious young shop foremen in Dayton, Ohio, organized a study group. They wanted to learn everything possible about management of industrial plants, and accordingly invited Louis Ruthenberg (now chairman of the board of Servel, Inc.) to conduct a series of management conferences.

In this group, during its first years, were such men as Charles F. Kettering, now General Motors Corp. director and research consultant; Frank H. Irelan, general manager, Delco Products Div. of General Motors, and A. L. Freedlander, president, Dayton Rubber Co.

Sessions of the group were so popular and results so gratifying that a permanent local organization was formed —The Foreman's Club of Dayton. Interpretation then given "foremen" was leaders or fore-men. The study-for-better management idea soon spread to other Ohio localities and to nearby states. Finally, in 1925 the present NAF was established.

Today in approximately 1,500 companies scattered over 35 states, more than 61,000 on the management team—65% of them in first-line positions—are benefiting.

Since membership never has been solicited, initial growth was slow—from 3,360 members in 1925 to 6,000 in 1942.

Expansion of industry during and since World War II has enlarged the ranks of management, especially first-line, and thereby greatly increased the need for management training and education. So association growth recently has been accelerated.

Another factor in the slow rise of early years was the attitude of some top managements toward this "foremen's" organization. Here is how Dr. James E. Bathurst, executive vice-president of the Association, describes it:

"For many years, NAF was looked upon by top management as being a sort of "lice dip" association, where top management could periodically disinfect their foremen from infectuous leanings toward various types of organized-labor groups of foremen. But now management looks on us as a maker of leaders in the management field. That is all we ever thought we were or hoped to be."

NAF and the Union

Even after 35 years of "proving" itself, NAF is misconstrued by some management men as a "foreman's union" and a part of organized labor. Actually, however, it definitely establishes its membership in the ranks of management and in no way is it organized by, or affiliated with, labor unions.

Then, is the organization anti-labor?

Definitely not, according to Dean Sims, editor of *Manage*, NAF's magazine. "NAF" he says, "is not anti-anything. If organized labor aids and builds the individual member to his own benefit and to that of his employer, then we are for organized labor. We believe our attitude is tolerant and patient. We do not condemn all of organized labor merely because of the much-publicized abuses of the system by many union groups."

In answer to the question, "Can NAF membership in a company be used for collective bargaining," Dean states that a flat "No" is the answer, the organization being clearly on the management side. "Nevertheless" he continues, "we know that getting along with organized labor has to be a give-and-take proposition."

Some managements unfamiliar with the group may under-rate its merits. However, in companies with NAF, top brass is enthusiastically for the association.

Two Types of Clubs

In many areas, NAF management training is obtained through "city clubs", membership in which is open to those who hold a management position in banks, wholesale and retail establishments, and service businesses as well as in manufacturing. Forty of the total 330 NAF clubs are city clubs. The rest are "shop clubs".

A shop club, or company club, draws its entire membership from one plant or company. And it's logical that it only can be sustained in organizations large enough to have 20 or more eligibles.

In contrast, the city club provides facilities encompassing large organizations as well as small. In most all of the city club areas there are company clubs as well as city clubs. Here, a member of a company club also may be active in the city club, profiting by association with management men in other industries and businesses as well as with those of his own company.

A Look At a Company Club

Now let's follow the development of a company club and its accomplishments.

Selected for scrutiny is one in a food plant with more than 1,000 employees and with more than 200 in its management group. A few years after formation of an NAF club in this company, almost all of those in the company's management group voluntarily had become active members.

Within the last six years, this company's top management faced the demand for improvement of management from bottom to top in the daily routine of job performance. Also vital was need to prepare individuals in first-line jobs to take over management reins in the levels above—if the company was to expand and to continue to follow its policy of promoting from within.

Effectiveness of various training programs was investigated in an attempt to provide means for upgrading foremen. Here, NAF was selected for further study.

As a follow-up, the company sent a small delegation of foremen to attend an NAF's annual convention. These men returned enthusiastic. They talked to other foremen in the company who were anxious to learn and to advance, and they discussed with them the advantages to be obtained.

Then, when there were enough foremen interested, application was made for an NAF charter. Then NAF headquarters men called on the company's president.

The association's success in improving management in a company depends, in part at least, on top management's understanding of NAF's objectives, and also top side's willingness to cooperate.

And in identifying itself as an educational non-profit, non-political association open to affiliations by all men who are employed in jobs of management, NAF has three objectives: (1) Better qualified leaders among management—all management. (2) Unity among all segments of management. (3) Preservation of the free enterprise system.

So, unless executive management is in accord, the club's chances would be in doubt.

Though in this food-company club all management is eligible, the club is operated and directed by first-line management members. They alone can vote or hold office.

Although the gains derived by top management and the company since the club's inauguration have been considerable, it is in fact a foreman's club operated primarily for the advancement of first-line management.

This club, like all other affiliated groups, must be at least 75% educational in function. No organization can belong just because it wants to. The NAF refused affiliation to 27 clubs in 1950 and dropped at least as many during the year because they failed to meet the educational requirements.

Though the required once-a-month evening meetings provide a social occasion and promote good-fellowship, the programs are educational. Topics covered are of practical value to job performance or in preparation of the individual for advancement.

In addition, there are special study courses encompassing a wide range of subject matter. It is only required that a sufficient number of members enroll.

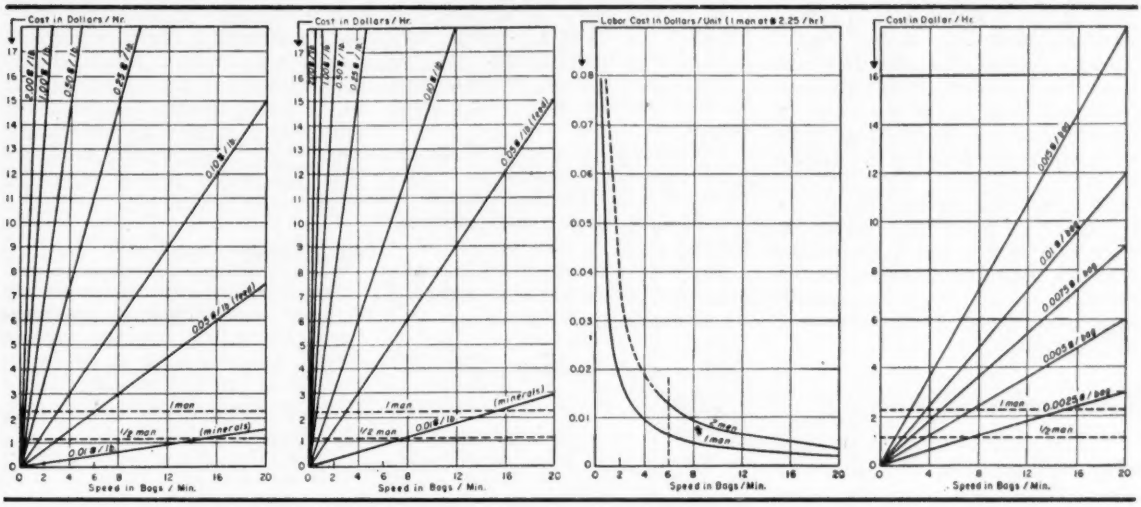
Arrangements for classes are made by the local club,

(*Turn to page 134*)

Hailed by AF of L

NAF accomplishments are respected by labor as well as management. Listen to James Anderson, editor of *Labor News*, published by the American Federation of Labor, Dayton (where NAF originated): "I have never heard anybody, labor or management, criticize the NAF. It accomplishes only good for everybody who depends on American industry for a living, and that includes just about every man and woman in the United States."

2-Oz. Give-Away ↓ 4-Oz. Give-Away ↓ Labor Cost ↓ Size Cost ↓



How to Slash Your *Bagging Costs*

4 Troublemakers and 5 Ways to Beat Them

ARTHUR BURKE
Chief Engineer, Richardson Scale Co., Clifton, N. J.

To lose money in your bagging operations is easy.

But once you spot the leaks and set up a working routine of blocking them, you quickly spell out the difference that keeps things on an economical footing.

Here, first, are four places to look for trouble, followed by five A, B, C's for cutting costs:

1—Weight-Control Give-Away

Regulations on weights and measures, and often the desire to consolidate customer goodwill, tends toward the practice of setting the mean weight on the bagging scale higher than the nominal weight.

Thus, no bag falls short in weight. But the new mean-weight setting generally is "over" by the amount of the maximum weight variation, resulting in a give-away of material practically in every bag.

For old, sluggish, and poorly maintained scales, the weight variation may be considerable. Losses may be especially high when you are bagging at high speed or bagging an expensive commodity. For instance, in bagging a commodity worth $.10 per lb. at a rate of 12 per min, even a 4 oz. give-away costs $18 per hr. And in bagging a product worth $.25 per lb. at a rate of 4 bags per min, a 4 oz. overage would cost $15 per hr. (see charts above).

2—Excess Labor Costs

It costs $3,500 to $4,500 yearly for one bagging operator. The amount includes miscellaneous benefits. Using the higher figure, labor costs for one- and two-man bagging systems have been analyzed for the full range of speeds (chart above).

Some installations require additional labor. Standby labor, for instance, may run as high as 20 to 33⅓% of ordinary labor cost. Maintenance may require 1 hr. extra of labor atop an 8-hour shift. If it is necessary to consider both maintenance and standby labor, they may be covered by a 50% increase.

3—Wrong Bags

Bag cost in your operation can rise with speed where sizes are "off". Here, we refer to bag sizes of 50 lb. and up. At high speeds, this factor takes on real significance. For instance, a medium-priced cloth bag that is 1 in. too large, run at bagging rates of 4 per min., costs about $2 per hr. And at 20 bags/min., it zooms to $9 per hr. (final chart).

Bag cost in the operation depends, too, on type and size. Types might be considered as open-mouth (paper, cotton, and burlap), and valve. Remember that size changes aren't all alike. For example, in paper the modification may be in width as well as length. In cotton and burlap, size changes generally are in circumference or length. These lengths are standardized pretty much at 30, 31, 36, 37 and 40 in.

How much more expensive is the valve bag? A valve bag performing a given bagging operation may be smaller than the open-mouth bag required to perform the same operation, because there is no extra material required for the handling and closing of the valve bag.

Yet the valve bag usually will cost more for the given operation. For example, two typical fertilizer bag sizes are 14¼x3½x30½ in. for the valve bag and 15x3½x32 in. for the open-mouth paper bag. The valve bag costs $.005 more than the openmouth bag along with the tape, thread, and cotton filler cord used to close it.

When the same sizes are compared, the difference in cost naturally is greater. For example, a 15x5x30 in. valve bag (4-ply) costs approximately $.01 more than a 15x5x30 in. open-mouth bag of similar construction, and with the material for closing it.

When the cost for the same bag size is $.01 less, there is over a $50

savings per 8-hr. shift when operating at rates of 20 bags min. When bagging at 6 min. there is a savings of about $8 per day.

Note, however, that the difference in cost is less when smaller bags are compared. Reason: In the range of smaller sizes, open-mouth bags come with extra material on top to facilitate closing.

How expensive are small changes in bag size? In a paper bag, a slight difference in cost is less when smaller bags are compared. Reason: In the range of smaller sizes, open-mouth bags come with extra material on top to facilitate closing.

4—Improper Amortization

A nationally known process company amortizes its equipment in three years. How much could this company afford to spend on equipment that would eliminate one man from a bagging operation?

Again figuring one operator at $4,500 per year, the cost under a three-year amortization amounts to $13,500. At a 52% federal excess profit tax, a $6,500 investment is in order.

A company, however, may find it desirable to streamline an operation in preparation for a highly competitive period in spite of current profit incentive. By and large, most processors change their feeling toward amortization with the business outlook, just as most people change their attitude toward investments with the business outlook.

Now to our A, B, C's of cutting costs–

A—Proper Bag Size

In a speed-up, 1 in. extra of cloth in the bag may be the difference between red ink and black ink in the bagging operation. Take an extreme case–a speed-up for two men from 6 cloth bags per min. to 20 bags per min., which would be an absolute top for two men.

As a result of this acceleration, we would reduce labor from $.0125 to $.0036 per unit, saving $.009 per unit (see labor chart). But, in a speed-up it is often necessary to use larger bags to ease bag handling at the higher speeds. Using a conventional cloth bag in this case, there would be no savings if the bag length had to be increased 1 in.

If the size-increase were not necessary, however, the $.009 would represent about $21,000 in a working year (2,000 hr). This would allow for a $31,000 investment for new equipment, using the 52% tax and the three-year amortization.

B—Greater Production

In bagging relatively high-cost commodities, a speed-up is not worthwhile if accuracy is compromised. There is little risk in a step-up, however, when low-cost commodities are being bagged.

For example, as a result of the extreme speed-up mentioned above, there was a $.009 savings per bag. If this resulted in a 3 oz. inaccuracy bagging a $.05-per-lb. product or a 1 oz. inaccuracy bagging a $.25-per-lb. product, it would just about wipe out the savings.

C—Increased Accuracy

Improvements in accuracy can be justified easily. Consider bagging a $.05/lb. material in 50- and 100-lb. bags at a rate of 12/min. where the bagging scale accuracy is ±4 oz. Improving the accuracy 2 oz. would save $4.50/hr. This would justify an investment of $13,000 for more accurate equipment, using the three-year amortization figures and the 52% tax.

Incidentally, the $4.50 saving is equivalent to the labor cost of two men. Therefore, two 2-man bagging systems operating at 6/min. at a 2-oz. accuracy are, consequently, no more costly than two men doing 12/min. with a 4-oz. accuracy.

D—Right Bag Type

If the operation is slow and the problem involves bag cost, the open-mouth bag probably is to be preferred. If bagging could be done with a non-tuck-in sleeve and a glued bag, the valve bag would be favored.

The latter, although it costs more than the open-mouth bag, is less costly to handle. Requiring no closing operation, it allows one man to run a bagging installation. At bagging rates lower than 5/min. or 6/min., however, one man can weigh-out and close open-mouth bags.

At higher rates, the extra labor needed to close the open-mouth bags nearly balances the valve cost. If the difference in cost of the two bags, for instance, is $.007 at a bagging rate at 6/min., the valve bag costs as much to use as the open-mouth unit. The same applies when the difference is $.0018 and bagging rate is 20/min.

It takes careful study to find out which bag is best at high rates. An impartial bag supplier can make such a study best for you.

E—Sewing Factors

Before considering automatic sewing, you should be sure you are getting best accuracy and lowest bag cost.

An important thing to remember is that it is nearly impossible for an automatic sewing device to completely replace a sewing operator. Sewing heads require maintenance. Much of this maintenance is a manual performance by the sewing operator. He frequently oils the machine, repairs broken thread, adjusts the sewing head, besides performing general preventive maintenance service.

Added Tasks

He also is an inspector–sees when a thread breaks and holds up operation until repairs are made. Where a tape closure is involved, he fingers the top of the bag to make certain that the sewing passes through both the tape and the bag.

With automatic sewing, therefore, maintenance may become a problem. Automatic sewing certainly will not eliminate a full man. A more realistic figure would be "one-half of a man."

It is unlikely that automatic sewing can be had by eliminating one-half man. Based on a figure of $4,500 a year, the one-half-man cost amounts to $2,250. For a three-year amortization and a 52% tax on profit, an investment of only $3,300 can be justified, which is probably too small to buy automatic sewing equipment.

Before reducing labor cost by installing automatic sewing, it pays to exploit the possibilities of better accuracy or reduced bag cost. For example, in bagging a commodity costing $.05 lb. at a rate of 12 bags per min. a ½-oz. accuracy improvement will save as much as automatic sewing.

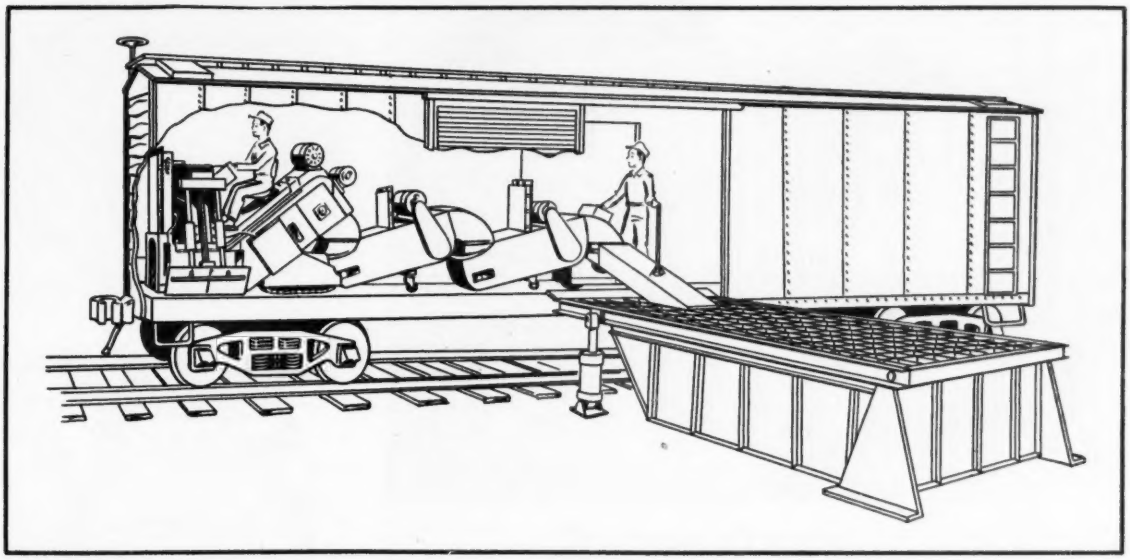
It is probably more feasible to buy, with the $3,300, a ½-oz. accuracy improvement rather than automatic sewing equipment. Relative to bag cost, automatic sewing easily could require use of larger bags to facilitate the automatic sewing operation. At 12 bags per min. a bag cost increase of $.0015 would cancel out a $3,300 savings provided by automatic sewing.

Savings Cited

On the other hand, where accuracy and bag cost are at the optimum, and where speeds of, say, 20/min. and a three-shift operation is involved, labor reduction could provide a saving. If two 2-man systems are required without automatic sewing, a saving of 2½ men on each shift is possible.

This saving would amount to $33,750 per year. It would justify an investment of about $53,000 on the basis of 3-year amortization and a 52% tax. Significantly, if the tonnage is high, automatic sewing can be important.

NEW EQUIPMENT & SUPPLIES



Bulk Handler Speeds Box Car Unloading

Free-flowing bulk materials—grain, salt, sugar—can be speedily unloaded from railroad box cars with this self-propelled unit. Rated capacity is 10,000 bu. of grain per hr.

Operating crew is comprised of two men, one at each end of machine.

Front unit is a flight conveyor which feeds automatically from both front and sides. It conveys material through articulated units of belt conveyors and a discharge chute, out through door of box car into hoppers and on to belts under railroad.

Unit rides on continuous tracks. Front end eats continually into pile, feeding conveyor. Hydraulically-controlled side-scraper arms reach out to walls of box car and scrape material into conveyor. This permits machine to operate to full width of car and empty each end of it in one pass. Scraper arms are controlled from operator's pulpit on front unit and can be operated either manually or automatically.

First unit is connected to two articulating belt conveyors and a discharge chute which permits maneuvering in and out of door. Belt conveyors are controlled by rear operator. Two hydraulic units on casters raise front end of machine off floor when it is backing out of car.—*Cargo Handlers Inc., 23501 Hoover Rd., Van Dyke, Mich.*

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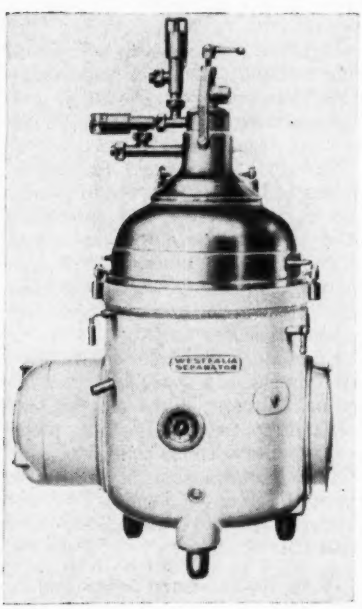

Centrifugal Performs Three Operations

Of interest to small or medium-sized dairies is a new centrifugal with which three milk processing operations can be performed. Named the "Tri-Purpose", it performs all three, hot (85 to 100 deg. F) or cold (40).

Unit separates cream from skim milk without creating foam, discharging it from hermetically sealed bowl by positive pressure. Whole milk is standardized and clarified in one operation, regulating butter content to close limits of 0.01 percent. Butterfat content of cream can be changed while unit is in operation. Finally, machine can be set for clarifying only.

Economy and efficiency of operation is increased through high capacity of large bowl. An important feature of bowl is its design for low-feed pressure. Lower pressure minimizes churning in bowl, which could cause butterfat particles to form and collect on internal surfaces of separator. This, in turn, would mean lower efficiency and longer "down-time" to clean out equipment, as well as loss of valuable butterfat. Another major advantage claimed for lower feed pressure is longer life of rubber seals, thus assuring constant pressure in hermetic bowl.

Straight-line surfaces have been incorporated into unit making cleaning practical. Another feature contributing to external sanitation is enclosed feed through top, which eliminates floor level piping, and allows cleaning under separator. A choice of white enamel or stainless steel finished frame is available. Internally, all parts coming in contact with milk are made of stainless steel. External controls are conveniently located for operator, and calibrated for precise separations.—*Centrico, Inc., Englewood, N. J.*

Circle 99B on Reader Service Card

Sliding Doors Highlight New Delivery Truck

There are no scrambled eggs with this special delivery truck. Handling is held to a minimum because sliding panel doors on side of truck body allow access to any part of load.

Cases are stacked so that they can be loaded and unloaded with ease simply by sliding open the side panel at front, middle or rear. Rear doors allow easy access at that point. This system eliminates shuffling of cases inside truck at each stop and gets the job done quicker.—*Chevrolet Div. of General Motors, Detroit 2.*

Circle 100A on Reader Service Card

Narrow Truck Negotiates Minimum Loading Space

Simplified pallet loading in any tight space is claimed for this new low-clearance, narrow width electric fork truck—the Safety Silhouette. Unit was designed especially for over-the-road vehicle loading.

Although mast height is only 68 in. operator's head is protected by design of truck. When driving, top of operator's head is below mast limit. Any opening which takes masts will also take driver.

Seat is accessible from either side of truck. Low cowl line gives driver full visibility, an asset when working in close quarters.

Lift, tilt and attachment controls are centralized and mounted beside steering column in easy reach of operator. Truck is also equipped with dead-man control which automatically applies brake and shuts off power when operator leaves his seat.

Available in 2,000 and 3,000 lb. capacities, truck is powered by a 15 kwh. 30 v. battery—ample for a full 8 hr. shift of operation at peak load.

Class H insulated drive motor is used as power unit. Truck can operate safely even at relatively high temperatures for long periods of time.

Truck is equipped with new magnetic Cam-O-Tactor control which provides smooth acceleration and extends contact life. Control consists of a magnetic contactor plus master accelerating switch which is a time delay unit providing uniform contact action regardless of rate of speed with which accelerator pedal is depressed.

Built on a 50 in. wheel base, truck equipped with 36 in. forks, pivots around a 90 deg. corner in a 61 in. aisle and can make a right angle turn in a 119 in. aisle. Forks are adjustable from 10 to 31½ in. outside measurement. Loads can be stacked 100 in. above floor level.

In operation, forks can be tilted 3 deg. forward from perpendicular and 10 deg. backward. When load is hoisted backward tilt provides stability in transit.

Under-carriage of truck will clear at 41½% grade plates.—*Yale & Towne* steep bridge plates.—*Yale & Towne Mfg. Co., Materials Handling Div., Philadelphia.*

Circle 100B on Reader Service Card

Aluminum Transport Can Has Sealed-Tight Cover

Highlights cited for this new aluminum transport can are a hermetically sealed tight cover and a highly polished seamless, easy-to-clean inside surface.

New can is intended for use in storing and transporting food products and chemicals. Light weight is another feature. The 60 qt. size weighs only 18 lb. Contamination of contents is inhibited by air-tight sealing effect of cover and corrosion resistance of aluminum.

Heavy duty aluminum construction withstands severe shock and vibration during transport. Cans are designed for storing and transporting under pressure and vacuum conditions.

They are available in nine sizes from 3 to 60 qt.—*Chemical & Power Products, Inc., 11 Broadway, New York City 9.*

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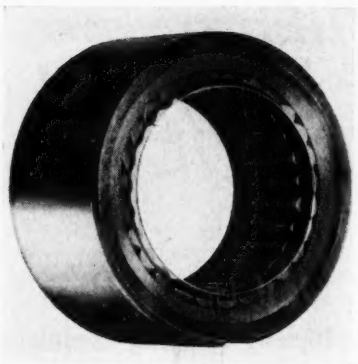

One-Way Clutch Units Serve As Backstops

These new cam-type, one-way clutch units are designed to serve as backstop (anti-rotation), indexing and overrunning clutches in a wide variety of machine drives.

Known as 200 Series, units are made with OD dimensions and tolerances corresponding to seven sizes of standard ball bearings. Clutches have no inner race; the full complement of cams bear directly on a hardened shaft surface. Thus, individual clutch units can be mounted in a machine housing bore adjacent to ball bearing supporting shaft on which clutch acts.

When applied as a backstop or anti-rotation unit in a machine drive, outer race of clutch is keyed in housing bore. Shaft on which cams bear can rotate or 'free wheel' in one direction only. If mechanism being powered starts to turn in opposite direction, came engage shaft diameter and 'lock up' to prevent shaft and entire drive from turning backwards. Lock-up is accomplished by wedging action of cams between outer race and shaft surface. Simultaneous wedging of all cams is assured by two energizing springs.

In backstop applications, clutch unit is usually installed on a high speed, low torque shaft of a power drive train or the output shaft of speed reducer powering drive train. Typical machinery applications of this type include speed reducers, speed changers, gear motors, variable speed drives and power drives in all types of industrial equipment such as conveyors, materials handling equipment, hoists, winches, pumps systems operating against heads and related applications where reverse drive rotation must be prevented.

As indexing unit, clutches act as self-contained ratchets with an infinite number of teeth. A typical indexing application clutch is in feed roll drives for punching, forming and shearing operations. A second cam clutch can be installed in such mechanisms to act as a backstop device.

Clutches are termed ideal units for general overruning applications since they engage instantly when torque is applied and disengage instantly when torque ceases. On multiple speed drives where two power units drive a common load, clutches can be installed to automatically disengage the low speed unit when the high speed unit is engaged.

Clutches are unit assemblies consisting of a hardened steel outer race, hardened ball bearing steel full complement cams, two steel energizing springs, two spring steel thrust washers and two soft steel retaining plates. Cam and energizing spring assembly and two steel thrust washers are retained in the keywayed outer race by two soft steel washer-shaped plates, one on each side of outer race. These washers are staked in position. Cams and energizing springs can be replaced without removing the retaining plates. —*Morse Chain Co., 7601 Central Ave., Detroit 10.*

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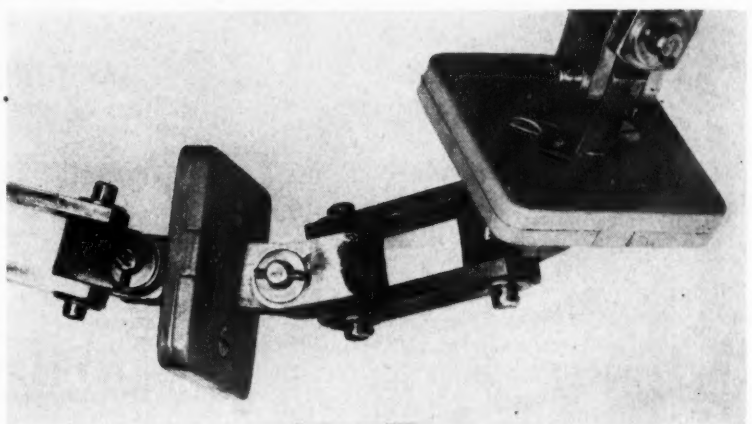

Bulk Material Mover Has Two-Directional Chain

Free flowing bulk materials can be moved in any plane in a new totally enclosed conveyor. Named the Tube-Veyor, it features a two-directional chain.

Bulk material is conveyed through square tubular section by means of two-piece spaced metal flights. Added features of carrier are:

Two-piece flight which can be replaced without disassembly of chain. Flights can be changed at any convenient spot (such as drive box), by indexing conveyor forward as required. Square tubing gives maximum surface contact between flight and tube. High graphite cast iron is furnished as standard flight material giving mechanical strength (especially needed at bends), self-lubricating, quiet operation. High temperatures have no adverse effect. Unit can operate in more than one direction without transfer points. System can have any number of feed and discharge points. Totally enclosed system is dust and liquid tight.—*Prab Conveyors, Inc., 19815 East Nine Mile Road, St. Clair Shores, Mich.*

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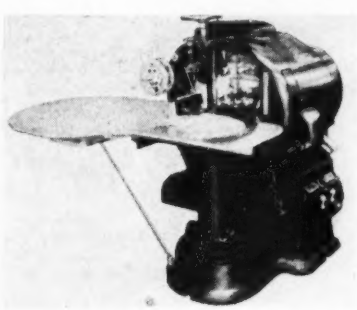

Candy Wrapping Machine Is Fast and Flexible

Square, round, rectangular, oval or crescent-shaped pieces of candy in a range of different sizes at speeds up to 180 pieces per min. can be wrapped by this newly-developed machine.

Called Forgrove No. 6 Bunch Wrapping Machine, it will handle cellophane, waxed paper or foil. Although primarily designed for bunch

Easier to Handle... Lighter... Smaller!

The New Polyethylene Shipping Container

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Save handling time and labor. Order the 50% concentrate of Roccal, the original quaternary ammonium germicide, in new 5 gallon polyethylene container. A simple "one-man" job to handle this new unit . . . measures but 11″ × 11″ × 11″, weighs only 45 lbs. completely packed . . . yet practically indestructible.

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6 Major Advantages OF NEW Roccal CONTAINER

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USE ROCCAL TO SANITIZE:

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wrapping, attachments can be provided for twist and sachet wrapping, and an additional paper reel for an understrip can be supplied when machine is used for latter. Machine can be equipped with a hopper feed as used with many types of hard candy, or can be hand-fed as when wrapping chocolate pieces.

Cams, gears and principal mechanism are totally enclosed, but easily accessible through inspection covers. Entire mechanism is continuously lubricated from a central sump by means of a rotary oil pump. Electrical equipment is built into framework of machine and "stop" and "start" movements are readily controlled by push buttons.

Speed is controlled by a screw knob from a minimum of 130, to a maximum of 180 pieces per min., while machine is running. A trip gear prevents feeding of wrapping material when disk pockets are empty. When using waxed paper or cellophane, heat-sealing mechanism is controlled by electrical trip action which prevents heater from remaining in contact with base of candy piece when machine is not running.—*Package Machinery Co., East Longmeadow, Mass.*

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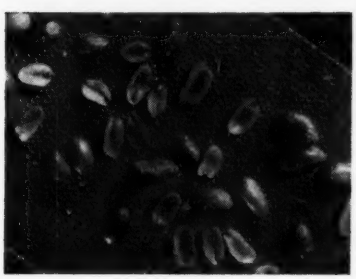

Inspection Belt Has Green Plastic Cover

Increased production and reduced worker's eye fatigue in sorting and inspecting operations are claimed with this new "easy-on-the-eyes" conveyor belt.

Called Plastex, it is now available with focal green plastic cover. It is a vinyl coated conveyor belting, available in all widths and plies. Green color is recommended for operations where food items, nutmeats, or similar products, are sorted or inspected on a moving belt.

Cover is washable; water-proof; acid and oil resistant.—*Buffalo Weaving & Belting Co., 260 Chandler St., Buffalo 7, N. Y.*

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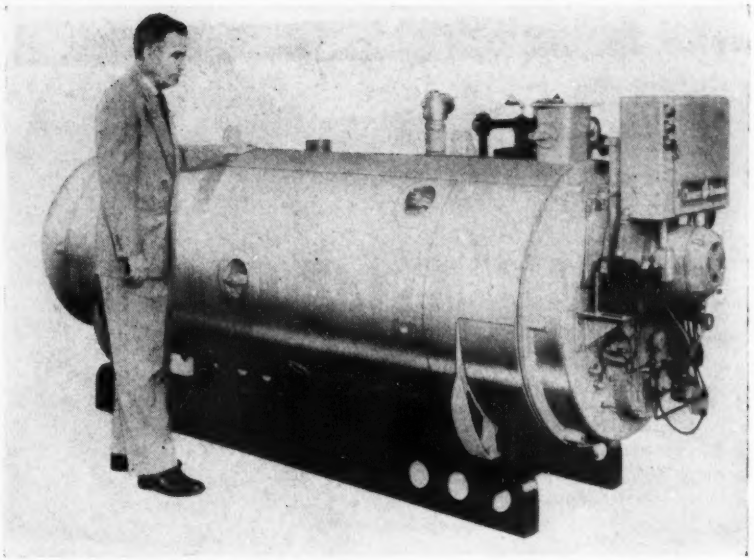

Packaged Boiler Has Numerous Advantages

Five major advantages are claimed for this new, compact packaged boiler called the "CB". Self-contained unit offers big boiler performance in small units of 15 to 40 hp. capacity.

In operation, unit is termed exceptionally quiet, having low decibel ratings. Unit burns light oils without difficulties often experienced on gun type burners. Standard equipment is the "Fireye" electronic combustion safety control, assuring safety in operation. Boiler has maximum accessibility for operation and maintenance with easy-to-open hinged doors on front and rear of unit. New model burns gas or oil at maximum efficiencies and can be converted from one fuel to other in less than a minute.

All operating and safety controls are easily accessible with burner components mounted on front head. Greater heat absorption is gained in four-pass construction and minimum efficiencies of 80% are guaranteed by the manufacturer when firing with oil.

New model is now available in sizes of 15 to 40 hp. Larger sizes will be available within a short time.—*Cleaver-Brooks Co., Milwaukee.*

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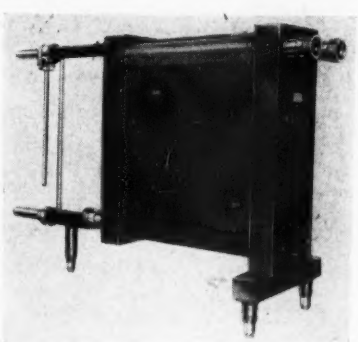

Plate Heat Exchanger Has High Efficiency

In process applications where heating, cooling or regeneration are required, high efficiency and low operating costs are reported for a new plate heat exchanger.

Among outstanding features reported for the unit are the plates themselves. Pressed from extra heavy stainless steel stock, and including a deeply corrugated surface, they resist distortion and are made to withstand higher than average operating pressures. Corrugated design results in high velocity and extreme turbulence of liquid. Heat transmission coefficient is high.

All gaskets may be replaced in user's plant without returning plate to factory.

Design permits thorough and effective "in-place" flush cleaning. Exchanger has been designed to comply with all sanitary requirements.

Plates are invertible and may be altered from time to time to adapt to changes in operation. Inlet and outlet parts in plates can be varied without use of new or extra plates.

Satisfaction rests on the carton

Every working day of the year sees tens of thousands of Union Corrugated Shipping Containers deliver famous brands to food outlets all over the United States. Lever Brothers Company, New York, is one of the leading manufacturers who specify these dependable boxes. Follow the lead of hundreds of the country's biggest shippers and talk to the man from Union—soon.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

Struthers Wells Corp. needed top dimensional

Proper tension of plates in press, for maximum gasket life, can always be obtained because of indicator marks stamped on tightening bars. Easy tightening of plates in press and uniform pressure are obtained by two-point tightening arrangement.

Exchangers are furnished in a wide range of sizes, models and capacities. —*De Laval Separator Co., Poughkeepsie, N. Y.*

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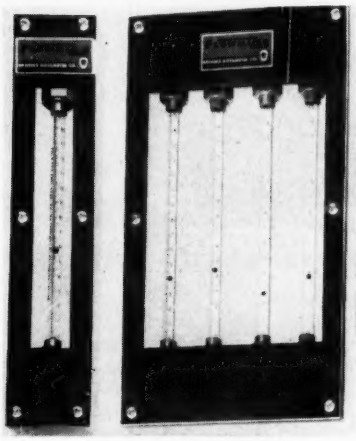

Tube Unit Indicates Flow Accurately

Accuracy in measuring non-corrosive liquids and gases at moderate pressures is provided by the Flow-Mizer, a compact, single or multi-tube flow indicator.

Unit features a heavy, one-piece steel case and may be flush panel mounted or installed directly in pipeline. Positive, self-aligning metering tube assembly includes "Tru-Taper" precision bore pyrex metering tube. O-Ring seal eliminates leakage.

Over-all capacity ranges of from 0.05 cc. per min. to 15 gpm. of water, and from 5 cc. per min. to 25 cfm. of air. Standard accuracies are plus or minus 5%—or units may be individually calibrated to provide plus or minus 2% accuracy. Unit is equipped with arbitrary scales. Direct reading etched metering tubes are also available.

Dual range unit eliminates changing tubes and floats by utilizing two floats in a single metering tube. Multi-Tube assembly with up to six metering tubes simplifies installation and saves space. Multi-units may be all one size or combine various size groups.—*Brooks Rotameter Co., Lansdale, Pa.*

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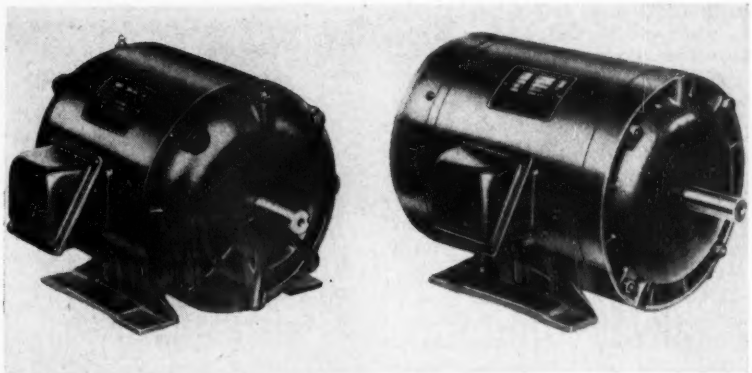


Size Same, Horsepower Doubled In New Motors

These new Series 100 re-rated polyphase a.c. motors, in the 1 to 30 hp. class, are built to the new frame-size to hp. standards set by NEMA. They are smaller and lighter than present motors. In some, the hp. is actually double that formerly available in frames of the same size.

Frames are made of rolled steel, end plates are of cast iron. This makes an extremely rigid structure. Use of rolled steel permits more space for windings. Nearly 50% more contact area between cooling air and active materials assures maximum ventilation.

First motors offered in new line are: Open, drip-proof motors; and totally enclosed, fan-cooled motors. Both types are available in 182 and 184 frame sizes, rated at: 1, 1½ and 2 hp. at 1,800 rpm; 1½, 2 and 3 hp. at 3,600 rpm; and ¾, 1, 1½ hp. at 1,200.

Re-rated drip-proof motors have bearing shields to keep out foreign matter. Bearings are locked on shaft and in end plate; inside grease caps are a standard feature. Diagonally split terminal boxes provide ample space for connections. Re-rated, totally enclosed, fan-cooled motors retain essentially same contours as open motors since practically the same air passages are used. External fan is enclosed by a pressed-metal guard. Split-hub-type aluminum fan is easy to remove for servicing.

Cartridge-type bearing enclosures allow complete disassembly without exposing bearing itself. Motors are equipped with grease fittings and relief plugs.—*Howell Electric Motors Co., Howell, Mich.*

Circle 105B on Reader Service Card

Adjustable Spray Gun Speeds Pan Greasing

Numerous advantages are claimed for this new fluid stream and spray gun, designed for the greasing of pans used by the baking industry.

Unit requires no air or electrical supply, permits changing from a solid stream to a fine spray during operation and without tools, and is self-cleaning.

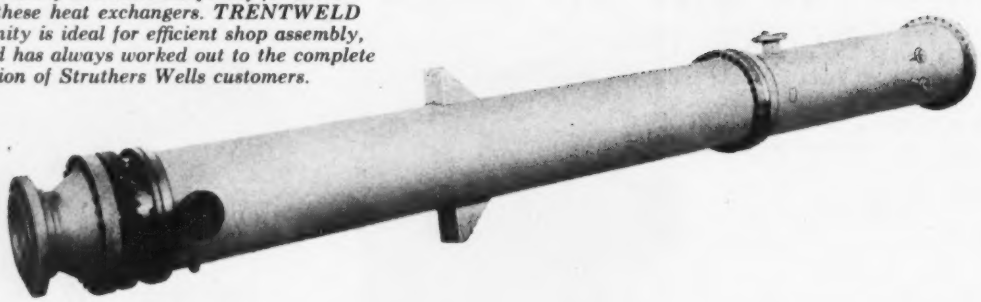
Choice of atomized spray or solid stream is made by simply turning a knurled shaft. Intensity of spray or solid stream can be varied by pressure maintained by trigger action. Degree of atomization of spray is affected by the viscosity of oil used. By pressing end of knurled shaft forward, orifice of nozzle is automatically cleared of solids or clogging which may be due to drying out of liquid on previous application.

Gun is light, weighing slightly more than 1½ lb. and readily lends itself to one-hand operation without tiring. It is constructed of aluminum, brass and steel. Overall height is 12½ in. and diameter of 1 qt. container is 4½ in. Container is easy to fill.—*C. W. Harwin, Inc., 2068 Castlewood, Toledo.*

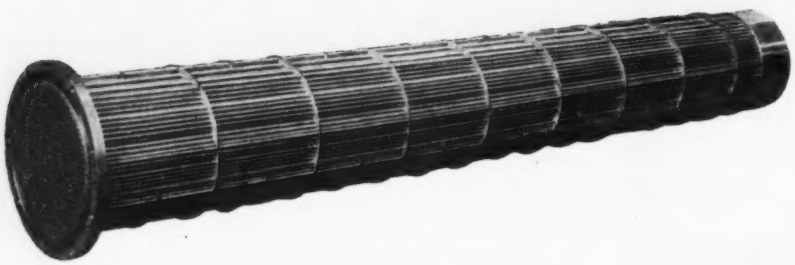
Circle 105C on Reader Service Card

New Equipment & Supplies

Struthers Wells Corp. needed top dimensional accuracy and material quality for tubes for these heat exchangers. TRENTWELD uniformity is ideal for efficient shop assembly, and has always worked out to the complete satisfaction of Struthers Wells customers.



always uniform . . . extra quality . . . largest selection



TRENTWELD stainless tubing

It takes *specialists* to manufacture stainless welded tubing of uniformly high quality. That's why TRENTWELD is the *preferred standard* for quality wherever stainless or high alloy tubing is required.

For TRENTWELD stainless tubing is the product of tube mill specialists. The unique Trent process results in a *uniformly sound* weld indistinguishable from the parent metal – *and equal or superior to it in strength, ductility and corrosion resistance.*

Don't forget, too, that Trent offers you the widest size range found anywhere. ⅛" to 40" O.D. are standard sizes... and even larger diameters are available if you need them.

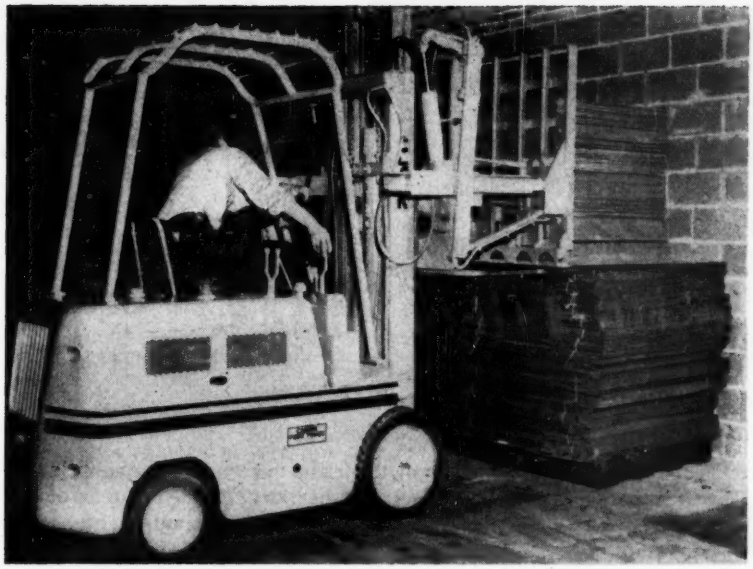
So, whether you need stainless tubing for heat exchangers or kiln dryers... fountain pens or frying pans – *for any requirement* for stainless or high alloy tubing – remember: *you can't buy better tubing than* TRENTWELD.

FREE – ask for your copy of the new book "Trentweld Stainless and High Alloy Tubing." You'll find practical details on applications, plus full tables on physical and chemical properties, and weights per foot on the sizes and grades you need. Send for your copy today.

TRENTWELD

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)



Redesigned Attachments Up Truck Efficiency

Increased efficiency, enlarged capacity, and easier, less frequent maintenance are features claimed for redesigned push-pull fork truck attachments.

One, called the "Pul-Pac", is a combination push-pull device that permits use of a thin carrying sheet instead of the conventional type wooden pallet. The other, the "Pusher Device," which does not have a gripper jaw on the rack, eliminates manual unloading of cartons, bags, drums or other material stored on pallets. Both devices are available for factory or field installation on gas and electric Clippers, and Carloader model industrial fork trucks.

An important development is the ability to handle off-center loads smoothly. Unequal stress is absorbed through a 1½ in. dia. solid equalizing shaft which distributes power equally through lever arms to the rack.

On the Pul-Pac unit, the gripper jaw is now detachable instead of being welded to rack, and thus is more accessible for replacement or repair.

Hydraulic gripping action is improved through use of a sequence valve which coordinates actuation of jaw with movement of the rack. Jaw is automatically closed in a gripping position an instant before rack moves forward. Both gripping and rack movement are actuated by a single action of operator's hand in sending rack either forward or backward.

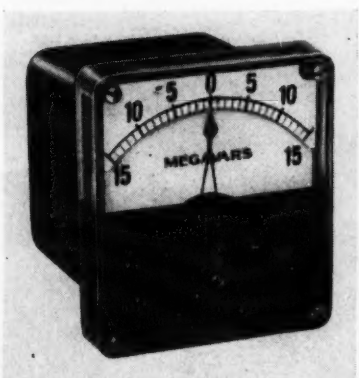
Racks are wider and stronger across the face than the previous units. Their faces present a smooth and more closely webbed surface to facilitate positive load alignment and stacking. Standard load plate is 5¼ in. wider than the previous plate.

Maximum freedom from maintenance is assured by elimination of complicated linkage and cam action. Pul-Pack rack may be removed by unbolting four bolts on either side and disconnecting hose lines to gripper cylinders. Attachments are removed by simply detaching hoses at uprights and unbolting fork support bars from upright lift brackets.

Telescoping innerslide construction of thrust guides insures strength and forward stroke alignment for accurate, service-free rack movement. Guides are made from rugged alloy steel upright channel.

On both units speed of rack movement is approximately 15 in. per second.—*Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.*

Circle 107A on Reader Service Card



Switchboard Instruments Feature Easy Reading

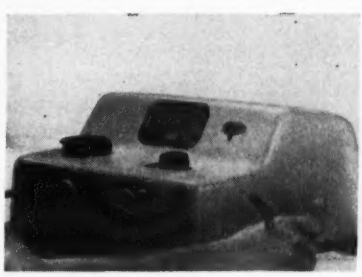
Excellent scale visibility with shadows reduced to a minimum is claimed for a new line of 4½ in. switchboard and panel instruments equipped with clear plastic fronts.

Designated Model 610 Group, new instruments have plastic fronts which admit a maximum amount of light on dial from sides, top and front, and thus eliminate need for internal illumination under normal operating conditions. The "in-line" pointer and dial, in which scale is raised in plane with the pointer tip, eliminates parallax errors and permits accurate readings at an angle. This combination of features provides quick, accurate readings.

Lower portion of plastic front is normally black, but other colors can be provided where color coding is required. Instruments also can be furnished with black Bakelite fronts, with or without in-line pointers and scales. At slight additional cost, internal illumination can be furnished on the Bakelite front instruments with flat dials.

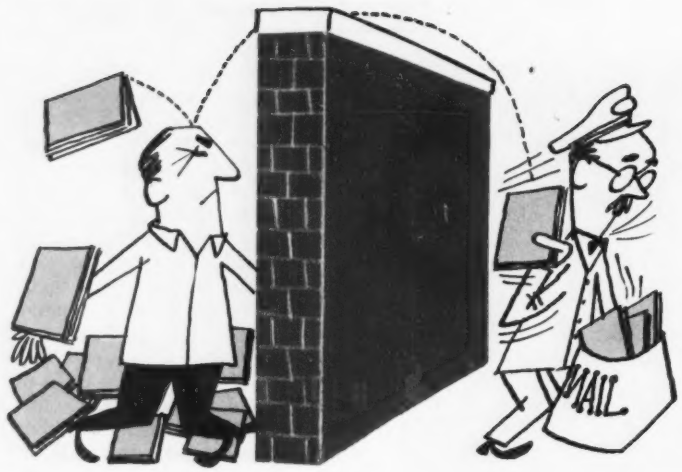
Scales are 3.5 in. in length; rated accuracy 1% of full scale value; size, 4 x 4½ in.,—*Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

Circle 107B on Reader Service Card



New Unit Simplifies Colorimetric Testing

Speedy, simple operation by production line inspectors and laboratory technicians is provided with this combination colorimeter and spectopho-



Stand back, Smugg—

HERE COMES THE MAIL!

WALDIN SMUGG is the publisher's prey. About the first of each month a special truck from the Post Office backs in and dumps a load of gazettes. A lot of them are even sent free, because Smugg refuses to *buy* any more of the darn things!

Because Smugg makes foodle, he gets all the foodle journals (8 of those). He also puts up a small pack of chowdy, so the publishers hit him with 9 chowdy papers. He can't *possibly* read all these magazines. He doesn't. He skims some of them—and even that wastes a lot of time. For, with the duplication and extra words cut out, the valuable plant-operations news could be condensed into *one* magazine!

Matter of fact, it *is*—in FOOD ENGINEERING.

FE saves time. Specializing in plant operations and management, it brings the important developments to each kind of food plant—Smugg's kind, *your* kind.

And FE goes further: Covering *all* the food industry, it enables you to pick up money-saving, quality-building ideas you get no other way. FE helps break down the artificial "walls" between food plants – helps each *kind* of food plant use the experience of the others.*

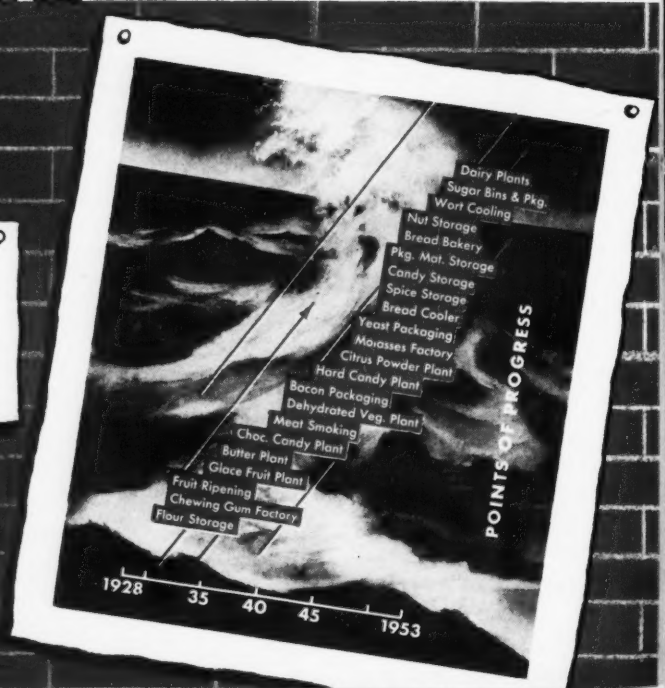
FE has the most subscribers of *all* food-plant magazines. There are reasons: Its bigger staff spends more money for better articles. It talks *only* plant operations and management. It doesn't restrict itself to one kind of food plant, but covers all. And, using McGraw-Hill's unmatched facilities, it scans other industries for ideas food plants can use.

* * *

Walled in by a narrower view of things, Smugg scans his mountain of magazines for morsels of meat. But outside his wall is FOOD ENGINEERING—the time-saver, the money-saver.

If you happen to see Waldin Smugg, please tell him about us. If you see him in your mirror . . .

LOOK OVER **YOUR** WALL WITH **FOOD ENGINEERING**



* . . . and food plants borrow and exchange ideas a lot! Here's a graph showing how the "tidal wave of engineering" has carried *air conditioning* from one kind of food plant to another. FOOD ENGINEERING helps you get new ideas from many types of plants.

Subscription rates on page 3

tometer. Only two knobs are used in making routine colorimetric analyses.

Called the Spectronic 20 because of its 20mmμ band pass, instrument produces high wave length accuracy and spectral purity through use of a diffraction grating. Instrument offers flexibility and a high degree of accuracy to research and quality control people concerned with more complex analyses of spectrophotometry.

Instrument analyzes any liquids or solids which transmit light by subjecting a sample to specified wave lengths. Degree of light transmittances is registered on a double scale, where readings may be taken in terms of either transmittance or optical density.

Operator can adjust diffraction grating for any wave length in entire range of instrument by turning a control knob, without being limited to available filters. Effective range is from 375mmμ (near ultra-violet) to 950mmμ (near infra-red), according to producer.

As a colorimeter, instrument makes possible quick routine tests by subjecting sample to fixed wave length settings. Resulting readings can be readily interpreted as concentration values from pre-determined calibrations supplied with instrument.

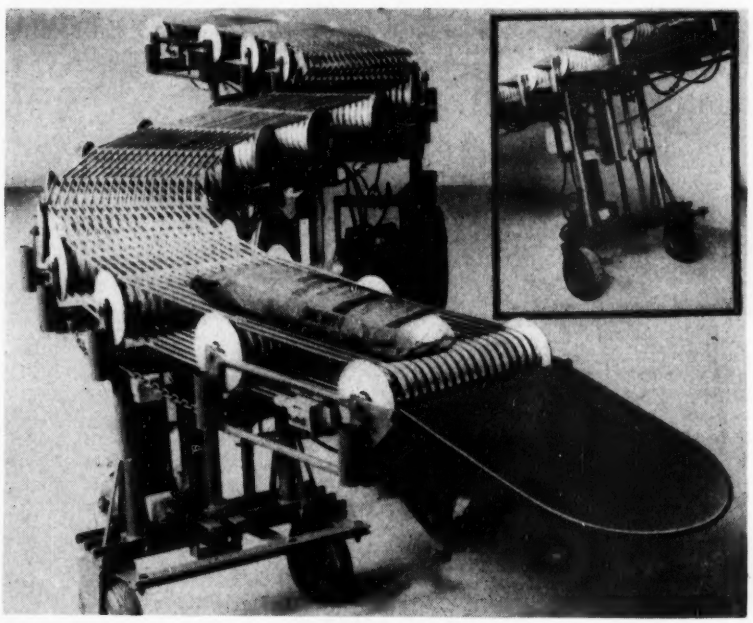
More intensive study is possible by using instrument as a spectrophotometer. Here sample is subjected to light of desired wavelengths to get transmittance and density readings for interpretative analysis and construction of transmission and/or absorption curves.

Basic components are a built-in grating monochromator, a photo-emissive detector to pick up light which passes through sample and transmit it in form of photo-electric current, and a printed-circuit electronic amplifying system to build up current so that it will register on scale.

For range from 650mmμ to 950mmμ, an infra-red tube and filter are quickly substituted for standard tube.

To eliminate vibration problems and insure accuracy of readings, a rigid, die-cast base is used, together with a one-piece housing.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.*

Circle 107C on Reader Service Card



Push Buttons Adjust Headstand Height

Discharge height is controlled by push-buttons on a power-operated headstand designed for use with a flexible box car loader.

Especially designed for continuous loading of bags, loader is able to discharge at any height from 3½ to 6½ ft. Bags can be packed to full ceiling height in box cars or trailers by one or two men in a fraction of time required by customary loading procedures. Average capacity for one man is 12 bags per min., 30 bags per min. for two men.

Headstand lifting mechanism uses a mechanical screw-jack chain-driven by a gear-reduction motor. Limit switches protect mechanism. Placement of headstand permits discharging up to 6 ft. beyond and above lower tiers of bags for stability and ease in stacking. Operator can move discharge end with one hand while operating height controls.

Chief feature of car loader is complete flexibility from end to end while in operation. It is self-propelled, self-retracting, and reversible. Conveyor can swing from side to side, and discharge end up and down as well, without stopping. A reversible electric drive provides full control of conveying speed, and a separate motor operating through an automotive-type differential makes loader self-propelled. It can be spotted rapidly and accurately where desired and as often as desired without interrupting loading or unloading operations. A radius as small as 8 ft. to either side provides easy access to all parts of box car.

Cast aluminum rollers are 24 in. wide. Coil spring belts form flexible conveyor surface and keep bags flowing smoothly to discharge plate without danger of snapping or ripping. Open construction also serves to keep cars clean, since material on outside of bags falls through and remains in pack house. Long life grease-sealed bearings save power and servicing.

When used in conjunction with bag filling machines, loader eliminates hand labor except for one or two bag stackers inside car. Loader can be made to any desired length.—*Power-Curve Conveyor Co., 2185 South Jason St., Denver 19.*

Circle 109A on Reader Service Card

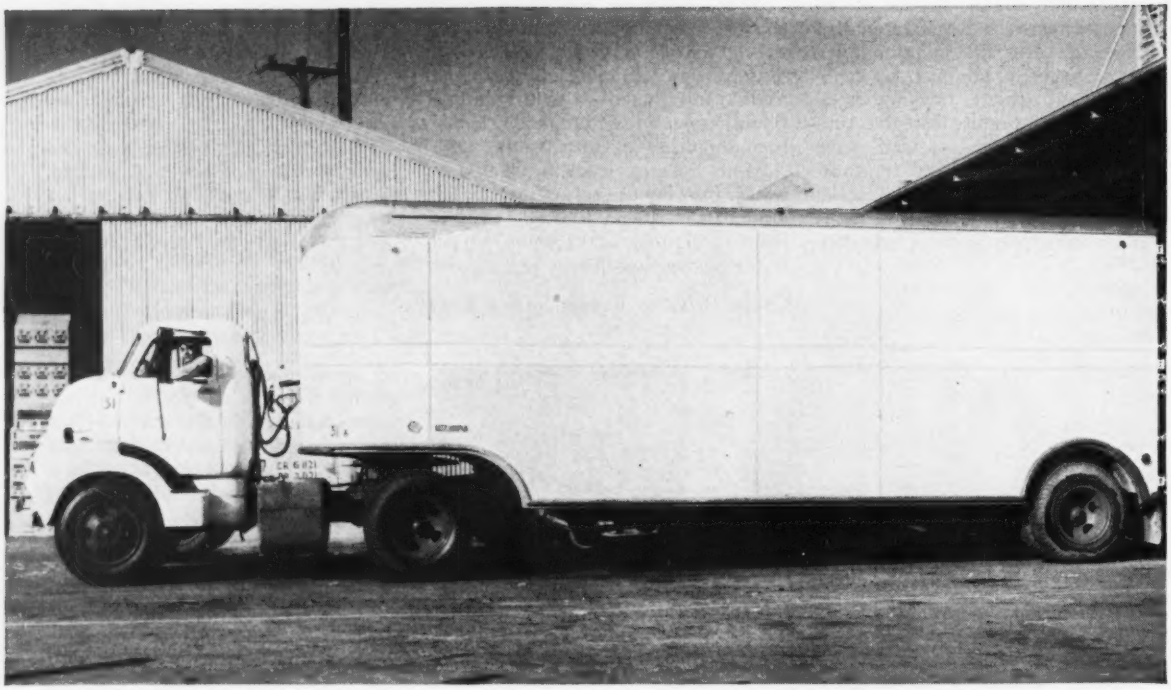
New Induction Motors Are More Compact

Longer motor life, greater flexibility in application, higher reliability and decreased size are advantages cited for a new induction motor. Features are improved ventilation, better insulation, more efficient and better protected bearing, quieter operation and smaller frames per hp. It is available in three enclosures: Totally-enclosed fan cooled, totally-enclosed non-ventilated, and drip-proof.

Wire, coil, dip, and cable insula-

New Chevrolet Trucks

deliver more power, more ruggedness, for less money!



Making sure the truck you buy has plenty of power and chassis ruggedness is good business in any man's book. Getting the money-saving extra power and ruggedness of Chevrolet trucks is *better* business in any man's book*keeping*.

EXTRA POWER MEANS BIGGER SAVINGS

No doubt about it, the extra power you get from new high-compression Chevrolet truck engines means you're going to pay out less for gasoline. Over a year, that adds up to a sizeable savings. Increased power brings time-saving benefits, too—greater acceleration and hill-climbing ability . . . you haul faster, get the job done quicker!

GREATER RUGGEDNESS CUTS OPERATING COSTS

Heavier axle shafts and wheel hubs on two-ton models; bigger, more durable clutches on light- and heavy-duty models; stronger, more rigid frames on all models. These features pay off in extra-low upkeep costs . . . extra miles of dependable truck life.

But these *while-you-drive* savings aren't all, by a long shot. You even save *when you buy*. For Chevrolet is America's lowest-priced line of trucks. Stop by your Chevrolet dealer's soon to see the "savingest" trucks on the road. He'll show you models ideally suited to your job, with facts to prove you'll get more for your money. Chevrolet Division of General Motors, Detroit 2, Mich.

CHEVROLET

MOST TRUSTWORTHY TRUCKS ON ANY JOB!

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates backrubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cabs of 1½- and 2-ton models, standard cabs only in other models. "Jobmaster 261" engine available on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

tions are all new. Wire insulation is a synthetic resin of high thermal endurance that increases life with no sacrifice in dielectric strength. Coil insulation is a combination of Mylar polyester film and rag paper that has a high dielectric strength. Dip insulation, insulates entire wound stator, is a phenolic-alkyd thermosetting-type varnish with silicone incorporated into the material.

Cable insulation, a lacquered glass braid covering, has an operating temperature of 75 deg. C.

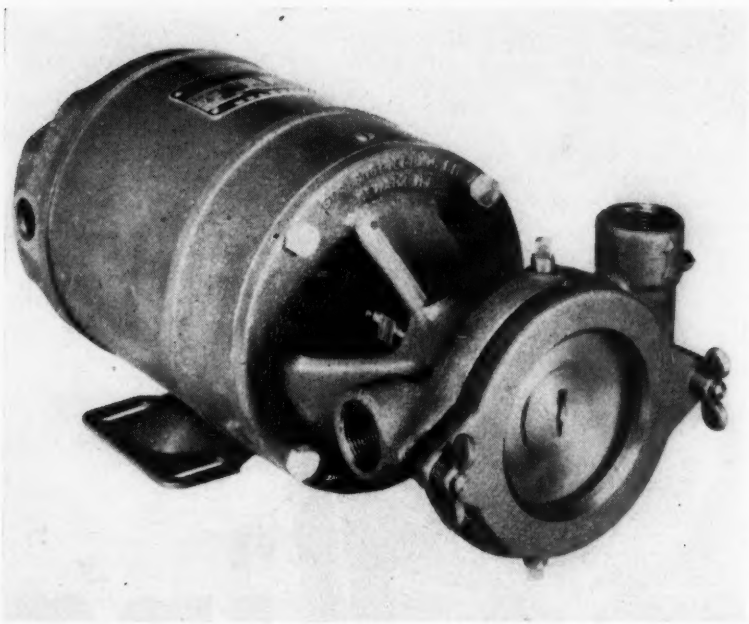
Ventilation system on drip-proof motor has been so improved that it is now suitable for both indoor and outdoor use and for all applications where a totally-enclosed motor is not required. System is a straight through design with ventilation openings located in one quadrant of rim of end bracket. System has been improved to such a degree, that splashproof enclosure has been eliminated. Totally-enclosed fan-cooled motor has radiating fins to take maximum advantage of available area for heat dissipation. Blower fan on totally-enclosed motor is made of molded glass plastic, giving it maximum protection in contaminated atmospheres.

Motor has a four-way bearing seal. Two seals are on each side of bearing. Inner seal is stationary and is attached to outer bearing race. Outer seal rotates and is attached to inner bearing race. This rotating seal acts as both seal and flinger to throw-off any foreign particles attempting to enter bearing.

All finishes are corrosion resistant. Conforming to the new NEMA standards, motors are smaller per hp.

Motor is much quieter in operation than its predecessor.—*Westinghouse Electric Corp.*, 401 *Liberty Ave., Pittsburgh* 30.

Circle 109B on Reader Service Card



Centrifugal Pump Has Transparent Plate

Liquids—foods or chemicals—being moved are visible in this pump equipped with a Pyrex front cover plate.

Made of stainless steel, unit is designed to protect purity of foods and resist attack from various corrosive chemicals. Maximum capacity is 30 gpm. It will pump against a head up to 24 lb. and has a maximum suction lift of 20 in. vacuum.

Design features include: Rear suction and discharge permitting accessibility without disconnecting pump from line; full visibility of fluid being pumped through Pyrex front cover plate; easy access to internal parts, by removal of 2 wing nuts, permits fast and thorough cleaning; continuous suction on stuffing box minimizes possibility of material being pumped entering mechanical seal; impeller screwed directly onto motor shaft assures alignment and sustained concentricity of seal; variety impeller designs handle clear and abrasive fluids. Dynamically balanced, and precision machined, pump is quiet in operation.—*Eco Engineering Co.*, 12 *New York Ave., Newark* 1, *N. J.*

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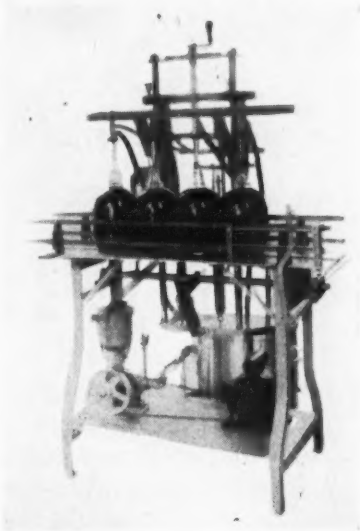


Semi-Automatic Filler Now More Compact

Ease in adjustment, moving, and change-over are stressed in the redesigned model of this straight line semi-automatic vacuum filling machine. Unit now occupies less floor space than former model and equipped with castors can easily be moved by one man.

By use of special spouts, containers from 7 gal. down to about 1 oz. may be filled. Cans F type, up to 1 qt. can also be filled on this machine.

Empty containers are moved along a stationary track to an adjustable stop which automatically centers them under filling spouts. These spouts are mounted in a slotted head assembly to provide lateral adjustment for bottles of various sizes. Vertical adjustment is also provided via hand wheels holding main assembly on two upright rods.

A slight pressure on a hand lever is required to move filling spouts downward into containers at which time sponge rubber gaskets on each spout seals containers.

When containers are filled to required level any excess liquid is withdrawn into an overflow chamber at rear which automatically empties into main supply tank located beneath it.

one stands out

in truck refrigeration it's

Thermo King

Thermo King is way out front. The features that make it outstanding are the practical engineering advantages that save money and save time for you.

For instance, a big stand-out advantage is "Semaphore" or stop-and-go cooling. When the cargo needs cooling, Thermo King's automatic control turns on the engine and starts the refrigeration cycle, then turns it off again automatically when the proper temperature is reached. Only Thermo King has this money-saving control.

LOOK OVER THERMO KING'S EXCLUSIVE STAND-OUT FEATURES

- Only self-contained, one-piece refrigeration unit that can be installed, replaced, serviced by simply removing four bolts . . . sliding out unit . . . no cables to disconnect . . . no fuel connections . . . no muss or fuss.
- Hot gas defrost system gives quick action. It's fast . . . it's safe . . . it's automatic.
- Double duty starter-generator within single compact unit. Starting load relief device and patented pressure regulating valve.
- Counterflow cooling coil especially designed by Thermo King provides greater cooling capacity.
- There's a network of factory trained Thermo King service along the Nation's principal highways. Quick and efficient service for you, made easier by single package design. Complete unit can be serviced or replaced in minutes.

Thermo King

U. S. THERMO CONTROL COMPANY, 84 So. 12th St., Minneapolis, Minn.

WORLD'S LARGEST BUILDER OF GASOLINE ENGINE POWERED REFRIGERATION UNITS

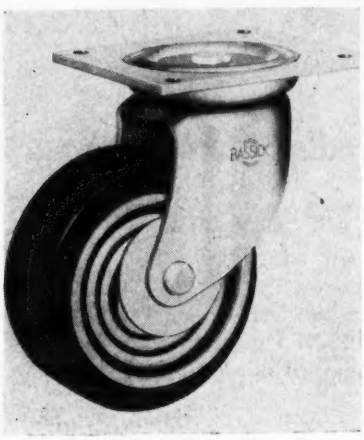
For more information, use coupon on page 187.

This tank is equipped with a float valve to maintain a constant supply of liquid.

Each spout has individual liquid feed via its own suction tube located in the supply tank. Several types of spouts are available, and, when required, as in case of shaker top bottles, special guides are provided to avoid damage to spouts.

Heavy liquids are handled just as easily as freely flowing liquids because of individual spout feed. Cleaning and change-over take about 15 min.—*Scientific Filter Co., 76 Rose St., New York City.*

Circle 111B on Reader Service Card



New Medium-Duty Casters Absorb Shocks Safely

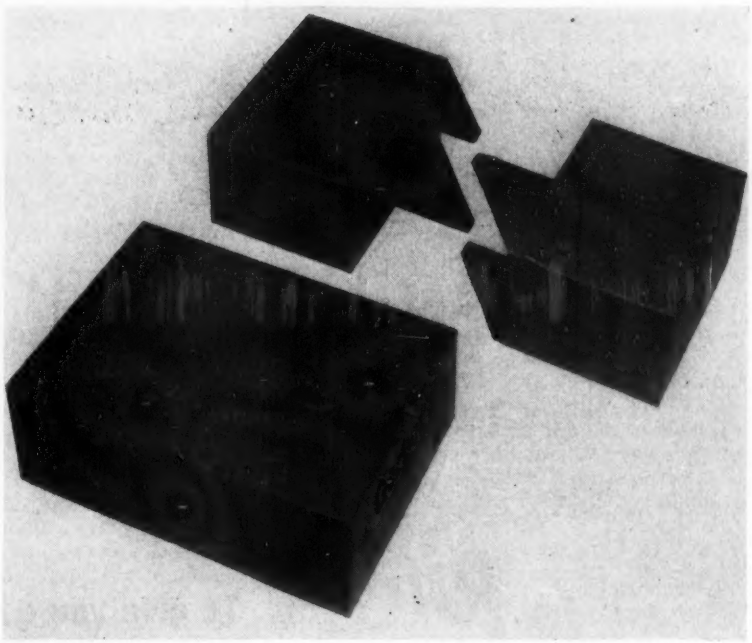
"Floating-Hub" design, employing a shock absorbing mechanism, has recently been incorporated in four new medium-duty casters.

With unit ball-bearing, floating-hub construction to provide load and floor protection, new casters are especially recommended by maker for safety moving liquid and fragile solid loads weighing from 100 to 700 lb.

Readily interchangeable with standard conventional medium-duty casters, new Series "09" and "10" come with 5½ and 7 in. dia, wheels in either swivel or rigid design. They are available with rubber or semi-steel tread wheels in 2 in. tread widths.

Manufacturer describes new construction as literally "floating" a spring-controlled caster wheel in resiliency between rim and axle. Even when traveling over bumps, all four wheels stay in contact with floor to absorb shocks safely.—*Bassick Co., Bridgeport 2, Conn.*

Circle 113A on Reader Service Card



Break-Apart Container Simplifies Handling

Reduced handling and warehouse costs are claimed for a new packaging case. New unit consists of two or more boxes with interlocking arms.

This allows processors to pack merchandise in larger quantities, and is especially adapted to shipment of cans and packaged goods subject to small-quantity distribution from district warehouses.

Interlock box is another step toward faster, more economical handling of packaged items. Multiple pack case ends old "tear them open" nuisance. It is designed for use with core sealer to glue extending arms joining sections. Completely sealed units result when sections are cut apart for case-breaking. — *Hinde & Dauch, Sandusky, O.*

Circle 113B on Reader Service Card

Sweeper Cleans Floors Without Polluting Air

Using a turbine principle, a new floor sweeper sucks dust from air at over 300 cu. ft. per min. while its heavy-duty fiber brushes whisk debris into a collecting hopper. This suction action eliminates pollution of air by dust. Hopper may be emptied of debris in about 10 sec., and dust bag's capacity (1.6 cu. ft.) is designed to make emptying infrequent.

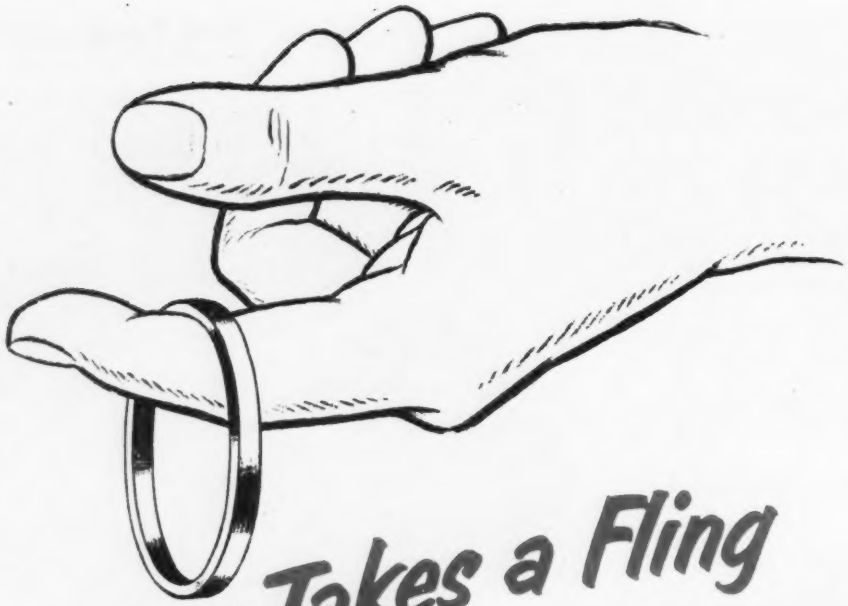
All controls are within easy reach of operator on "control console." Properly-placed castors make device highly maneuverable in obstructed areas. Rigid all-steel construction adds to durability. Tank-treated rubber tires on ball-bearing wheels provide long service life.

Called the Turbo-Sweep it is powered by a 2 hp. Briggs & Stratton gaso-

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 187. Then sign at the bottom and mail.

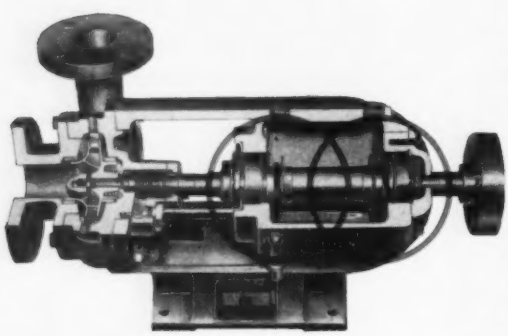
For your convenience, too, items in this department are listed and keyed in the Reader Service Section.



This Ring Takes a Fling

To give you a Cradle-Mounted Pump

THAT'S WORTH MORE



This oil ring is the best known method of lubricating cradle-mounted pump bearings. Two of them ride the shaft of Ingersoll-Rand's CRV pumps, dip into the oil reservoir, fling an abundance of oil and mist onto the ball bearings.

But these are more than just flinger rings. They are examples of the extra value that's built into every I-R cradle-mounted pump . . . to give you more for your money in design and construction, that adds up to longer pump life with less maintenance.

There are easier, less expensive ways to lubricate bearings; easier, cheaper ways to build pumps—but none of these are the Ingersoll-Rand way. Check today on the I-R way of building more on-the-job value into every pump. Your nearest distributor or Ingersoll-Rand branch office will be glad to tell you, without obligation, the complete story about Cradle-Mounted pumps and Motorpumps.

Cameron Pumps ARE Better

9-3

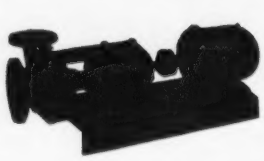
Ingersoll-Rand

Cameron Pump Division
11 Broadway, New York 4, N. Y.

Single-Stage Motorpump
Capacities to 1800 GPM

Two-Stage Motorpump
Capacities to 300 GPM

Four-Stage Motorpump
Capacities to 60 GPM

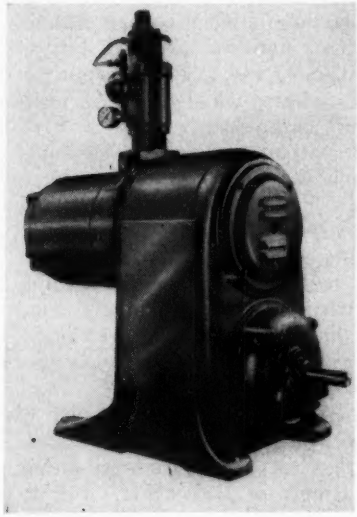


Cradle-Mounted Pump
Capacities to 2600 GPM

line engine muffled with a Maxim silencer.

The unit's 40 in. sweeping width permits cleaning of over 50,000 sq. ft. per hr. under normal conditions. Sweeper is available with sulky, headlight, charger and electrical accessories, or as a walking unit.—*Parker Sweeper Co., 100 Bechtle Ave., Springfield, Ohio.*

Circle 113C on Reader Service Card



Motor Speed Controlled By Process Variable

Automatic speed control of Varidrive motors by such variables as pressure, temperature, speed, or liquid level is now possible through a recent development. An improved pneumatic control called Varitrol, which may be operated either manually or automatically, has been designed into the variable speed motor.

Designed to operate on a supply air pressure of 60 to 100 psi, the motor is controlled by an air cylinder using air on both sides of piston for positive positioning. A small, sensitive positioner operating on 3 to 15 psi. signal air, controls a pilot valve regulating power air to air cylinder. Signal system to positioner may be any one of numerous control instruments now in standard use.

Feature of unit is approximate straight line relationship between signal pressure and speed. Typical types of control equipment which may be used on this pneumatic system are: Manual, speed set from a remote manual dial; pressure, speed varied to maintain a constant pressure, or speed proportional to pressure; temperature, speed proportional to temperature; liquid level, speed regulated to maintain constant liquid level in tank or reservoir; proportional flow, speed regulated by flow of liquids through a venturi or orifice meter or where material is passing on a belt conveyor over a weighing scale.—*U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54.*

Circle 115A on Reader Service Card

New Chemicals

Powdered Detergent Is Easy on Hands

Especially designed for hand cleaning operations in bottling, canning, meat packing, and other food processing plants is a free-flowing powdered detergent that dissolves quickly and completely in water. It produces long lasting suds that remain stable even when solution becomes contaminated with fats and solids. Detergent has efficient water softening and wetting out properties, and possesses ingredients that emulsify fats, dissolve minerals present in many soils, and deflocculate or disperse others.

For hand cleaning, manufacturer recommends concentrations of ½ to ¼ oz. per gal., at temperatures ranging from 110 to 140 deg. F. Material is also said to be effective in spray or soak tank use, in concentrations of ¼ and ½ oz. per gal. respectively, at 140 deg. F. or higher. It rinses freely in hot or cold rinse water.

Used as recommended, material is claimed to be easy on hands, and safe on stainless steel, copper, tin, aluminum, and glass-lined surfaces. It is available in kegs (110 lb.) and (325 lb.), and in cases of ten 10-lb. cans.—*Oakite Products, Inc., 126 Rector St., New York City 6.*

Circle 115B on Reader Service Card

New Cleaning Compound Has Uniform Particles

Savings are reported with use of cleaners compounded by a new method called Dio-Mix wherein all cleaner particles are of identical size. Thus problem of large, hard-to-dissolve particles at top of drum and fine powders at bottom is solved.

Economics claimed for users of cleaners is gained through product uniformity, since it will not be necessary to use too much of various sizes of powder to be sure of obtaining proper strength. Other features reported for product are: Freedom from sifting and separating powders; non-dusting; free-flowing; free-rinsing and water-solubility with excellent water-softening and grease-dissolving properties.—*Diversey Corp., 1820 Roscoe St., Chicago 13.*

Circle 115C on Reader Service Card

Ice Cream Stabilizer Dissolves Quickly

Improved whipping properties, lighter color and better dispersal are advantages claimed for an improved ice cream stabilizer. Known as Gelox, formula remains basically the same, but stabilizer is now of more uniform particle size and will disperse quickly and dissolve more easily.—*Swift & Co., 4115 Packers Ave., Chicago 9.*

Circle 115D on Reader Service Card

Speeds Cleaning Work On Bottling Machinery

Economy in bottling machinery cleaning operations is claimed with use of a new material designated NZL. Effective cleaning solutions are obtained by using only a tablespoonful to give gallons of water, manufacturer states. Faster cleaning and elimination of much of hand work is said to reduce costs by about half.

Cleaner is a compound based on effective concentrated wetting and cleaning agents with dirt-suspending qualities. Solution does not attack enamels or paints of equipment, or become difficult to rinse.—*Magnus Chemical Co., Inc., South Ave., Garwood, N. J.*

Circle 115E on Reader Service Card

OTHER DEPARTMENTS
Featured in This Issue

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In Behalf of Progress . . .

Red Armies and Research Bring Tinless Cans Closer

In a very real sense, the tin can is synonomus with food processing. So the international situation in Indo-China is of much more than political interest to our industry.

If it deteriorates much further, it can have far-reaching practical effects. Much more than half of the world's tin supply comes from that area into which Communist forces have been moving.

Sad to relate, the chain of events in the Far East since the Korean stalemate points toward continued, if gradual, extension of Red influence in the Indo-China area. It is obvious that the free countries are reluctant to take extreme measures to stop the Red movement, and for some very good reasons.

It is important, then, that our industry direct considerable research into the development and use of tinless containers.

True, the government's stockpiling program provides insurance against a short-time shortage of tin. But one can't count on the stockpile seeing us through. There are those who think that another major war would be a quickie A- and H-bomb affair. But there is a strong likelihood that the very awfulness of these weapons would make warring nations hesitate to use them, as in the case of poison gases in the last big war.

So there is at least an even chance that a third world war would be an "old fashioned" and lengthy one—too long for our tin stockpiles.

And even without a war, a major share of the world's tin supply may fall under Communist control.

It was encouraging, therefore, to hear the report on progress in the tin-free-can research program made at the recent annual meeting of the Institute of Food Technologists by Roger H. Lueck, general manager of research for American Can Co.

"Tinless cans of the future are expected to come from a number of metals now under investigation and available on this continent—including untinned steel, specially treated steel, aluminum, and steel coated with aluminum, zinc, and possibly nickel," Mr. Lueck stated.

There seems to be no one metal coating on steel which can serve as a universal alternate for tin plate for food containers, and new applications of tinless cans in the industry will have to be made pretty much product by product.

So this highly important container development program has a long way to go. But progress is being made—as was brought out in the IFT talk (see news story, p. 189).

New developments in plastic films and containers will bear watching, too. A new film which has one-third the tensile strength of steel and will stand temperatures exceeding 300 deg. F. has been made. And another film has been given high-temperature characteristics by irradiation with X-rays.

These developments hint at the possibility of flexible packages for some foods heretofore packed in metal cans or glass to permit heat sterilization.

Then glass containers of still lighter weights, and therefore cheaper to ship, can be expected in the future.

Every sizable food company with a research budget should be investigating the development and use of tinless containers for its products.

Meanwhile, the versatile metal can—now made to the extent of 35.6 billions annually—will continue to find new uses. Witness the current trend to carbonated beverages in cans.

You're the Loser If You Neglect the Exhibits

As a technical editor, we have attended scores of conventions and shows in the industry. And we have observed that a lot can be learned by careful study of the exhibits and by talking with men in the exhibitor's booths.

You always find new and improved machines and materials developed to help the processor do a better job at lower cost. You also refresh your knowledge of what the leading companies supplying products and services to our industry have to offer of value to you.

What's more, you often can benefit by calling your current problems to the attention of appropriate exhibitors at the show. It is their business to deal with such problems. And you may be sure they will give yours careful consideration.

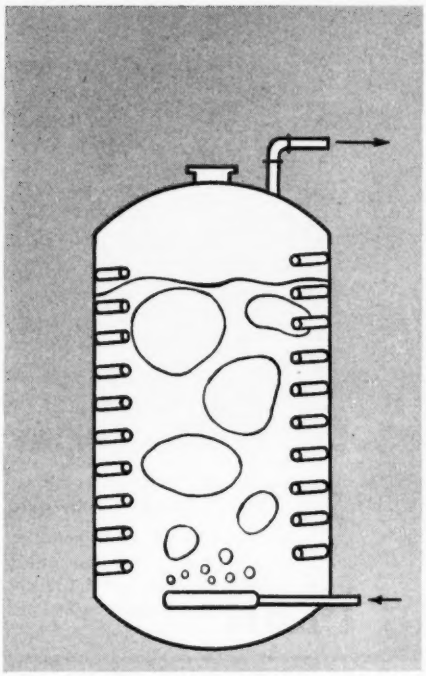
We were pleased to see on the program for the opening general session at the recent IFT meeting a brief talk about the exhibits. And the line "visit your exhibits" at the end of the programs for various sessions was a constructive touch.

Unfortunately, we still encountered too few food technologists during our tours of the exhibitors' booths. Other shows of equipment and supplies in the food industry are more crowded.

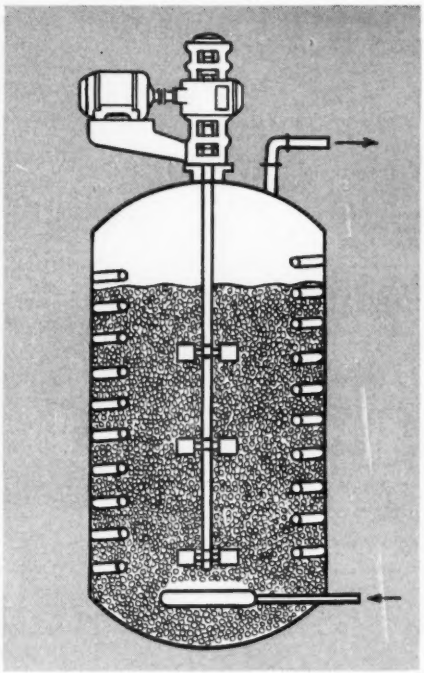
Relatively light show attendance has been too typical of food technologists at the annual IFT meetings. Too typical for the good of the technologists.

We haven't heard complaints from the exhibitors, for they have been impressed by the high caliber of the men who visited their exhibits.

But technologists who pass up the exhibits are missing an important phase of their education in current progress.

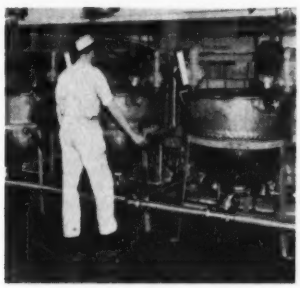


SLOW . . . Large steam bubbles rise directly through batch. Contact with hot lard is limited.



FAST . . . Dispersed into thousands of tiny bubbles, steam circulates again and again through lard.

LARD DEODORIZING, hydrogenation, and other big mixing jobs are handled rapidly with turbine-type LIGHTNIN Mixers. Hundreds of power-speed combinations, for open or closed tanks. Sizes 1 to 500 HP.



MIX ANY FLUIDS, in any open vessel, with the proper LIGHTNIN Portable Mixer. It sweeps the tank bottom, turns the batch over while rotating it, for thorough, uniform mixing, without baffles. Thousands in use. Sizes ⅛ to 3 HP.

Strip lard 47% faster

This simple change saves steam—and keeps your product homogeneous

You can strip free fatty acids from lard in half the usual time—with one simple change in the process.

The diagrams above show what happens when you add a LIGHTNIN Mixer to the stripping vessel. Steam entering the vessel is dispersed instantly in thousands of pinpoint bubbles.

Driven through and through the hot lard, these bubbles give many times the interfacial contact you get with sparge pipes alone. Tests show this cuts lard deodorizing time from 30 to 50%.

As a further result, you save steam—in the vessel and in the ejector system. Since operating time is so much shorter, you use much less steam to maintain the vacuum and to heat the vessel.

The mixing action keeps the lard homogeneous, too—prevents settling of heavy components.

This is just one of hundreds of jobs food processors handle with LIGHTNIN Mixers. For quick competent help on steam stripping, or *any* fluid mixing operation, call your LIGHTNIN representative. Or write us today.

Lightnin® Mixers

GET THESE HELPFUL FACTS ON MIXING

LIGHTNIN Catalogs contain practical data on impeller selection; sizing; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Yours without obligation. Check and mail coupon today.

MIXCO
fluid mixing specialists

- ☐ DH-50 Laboratory Mixers
- ☐ DH-51 Explosionproof Laboratory Mixers
- ☐ B-102 Top Entering Mixers (turbine and paddle types)
- ☐ B-103 Top Entering Mixers (propeller type)
- ☐ B-104 Side Entering Mixers
- ☐ B-105 Condensed Catalog (complete line)
- ☐ B-107 Mixing Data Sheet
- ☐ B-108 Portable Mixers (electric and air driven)

MIXING EQUIPMENT Co., Inc.
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Please send me, without obligation, catalogs checked at left.

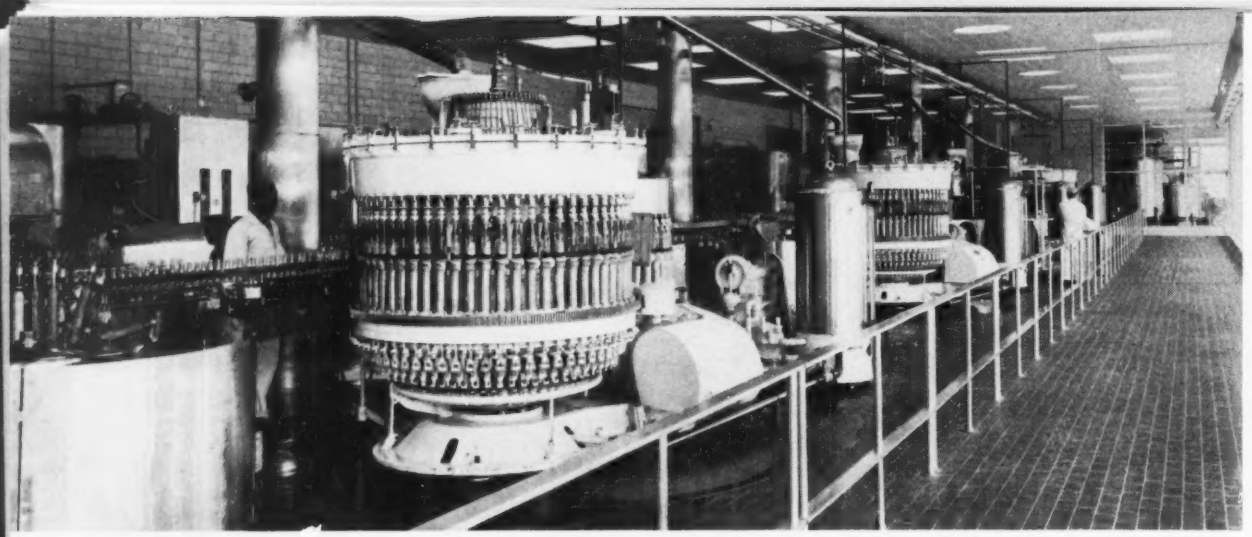
Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

TURN PAGE FOR FOLDOUT FLOWSHEET →



BEAUTY and sanitation feature the automated show-case bottling room. Typical of advanced units comprising filling lines is new 50-spout filler (foreground). Note how equipment has been specially placed for ease of operation achieving maximum efficiency.

Trail-Blazing Bottling Plant

Conveyor-pallet handling, automatic equipment and controls, modern design and materials bring top performance in newest Detroit facility

EXEMPLARY of the great progress in the soft drink field in recent years is the new 7½-acre bottling plant of James Vernor Co., Detroit.

Here, under one roof, are combined facilities for carrying out the entire ginger ale operation of the company. Included are compounding and aging of the extract, production of syrup, and filling into 8-oz. and quart bottles at a speed of more than 1,000 per min.

Also in the same building is storage space for supplies and finished merchandise, plus accommodations for more than 200 delivery and transport vehicles. Plant is completely palletized, and its automation reportedly exceeds any other in the field.

Extract is prepared from ground ginger and other essential oils in extract building—Point 1 in accompanying flowsheet. Then it is carefully blended, filled into 50-gal. wooden barrels, and aged for about 4 yr. in the special aging cellar.

For use in making ginger ale, extract is transferred from barrels to blending tanks in extract department and carefully standardized. Then it is pumped (as needed) to the syrup storage room, where an automatic measuring device delivers

For the story behind these advances, see page 61.

a predetermined quantity to each batch of syrup as it is transferred from cookers to coolers—Point 2. Flavored syrup is pumped from this room to bottling lines, jug filling, tank filling, or the retail fountain, by means of a Moyno pump.

City water is used for all requirements except cooling. For processing, it is given a thorough treatment, followed by sterilization with UV—Point 3. Employed are three systems operating in parallel. Each comprises 4 electro boxes, a 5,000-gal. baffled settling tank, 2 sand filters, 2 carbon filters, 2 polishing filters, and an ultraviolet sterilizer.

Treated water is piped to bottling lines, jug and tank filling rooms, extract and syrup-making departments. For the latter, it is first passed through the plate unit used to cool the sterilized syrup, then goes to a hot water storage tank—Point 4.

There are four bottling lines—two 8-oz., two for 24-oz. In operation, empty bottles arriving on conveyors from the warehouse, are uncased and placed on magazine feeders of the washers by new-style Liquid Carbonic full-depth uncasers—Point 5. Cases then move to Standard-Knapp cleaners and automatic packers.

Clean bottles discharge from opposite ends of washers—Point 6—and are conveyed past visual inspection stations to new type Liquid Carbonic combination fillers and crowners, then go to mixers. They are conveyed from bottling to packaging room, where they move past Miller Hydro visual filled bottle inspection units, then proceed to automatic case packers—Point 7.

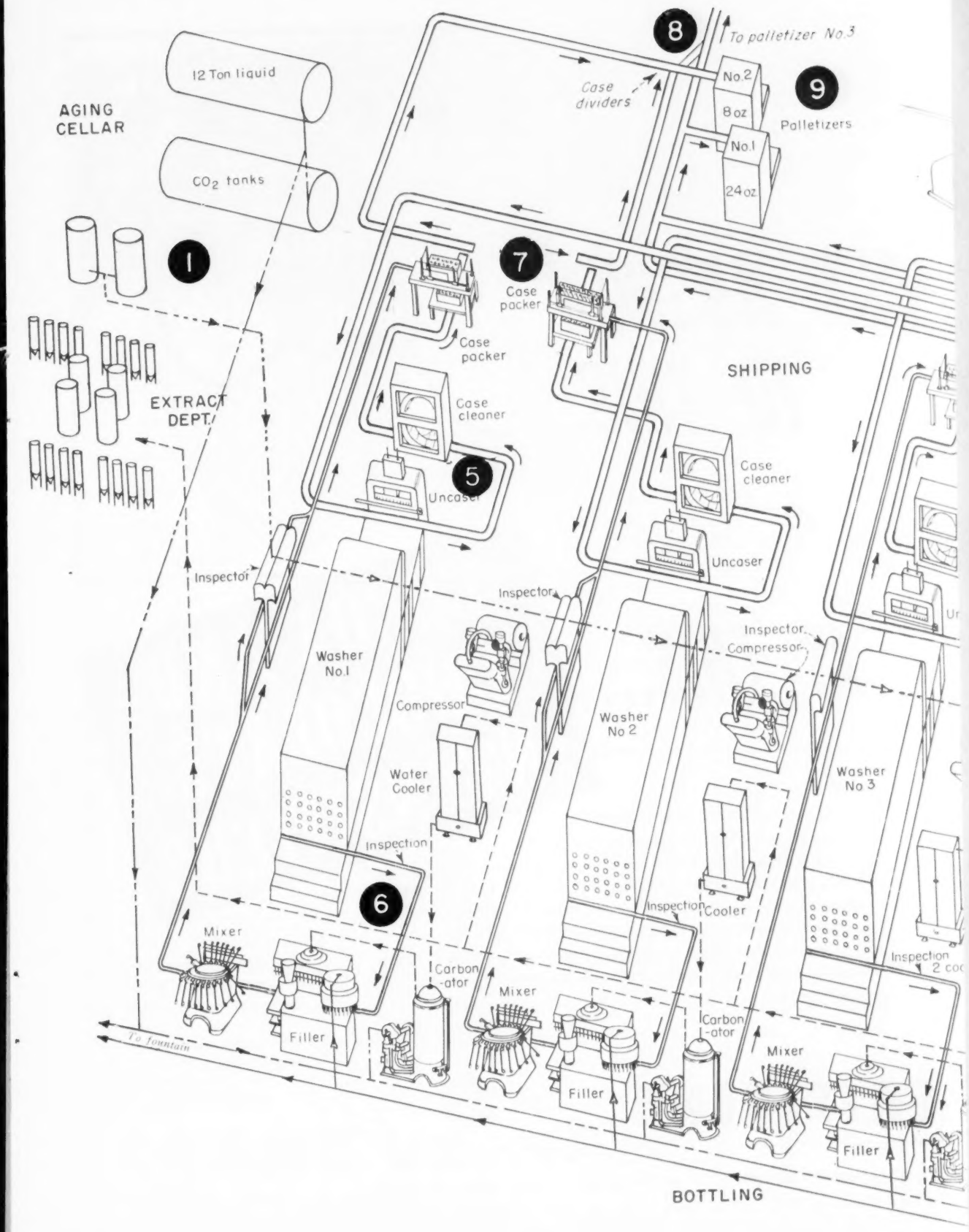
Filled cases move by belt conveyors to Alvey Conveyor Mfg. Co. case dividers—Point 8—that automatically count and dispatch a certain number to each of two off-bearing lines.

The count for either of the two receiving lines can be changed as desired by means of manually operated controls. This enables feed to the automatic pallet loaders to be under control at all times.

Three Alvey automatic pallet loaders are used to handle filled cases. Two of these—one for 8-oz., one for 24-oz.—are situated in the packaging room—Point 9. The third, which stacks either 8-oz., 24-oz., or a combination of the two, is installed in the warehouse.

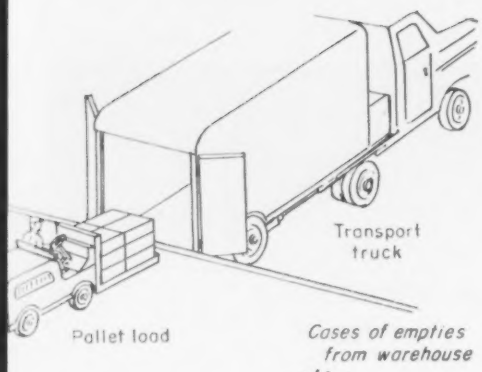
Fork trucks move filled pallets from loaders to storage areas, or load them directly onto transports or delivery trucks.

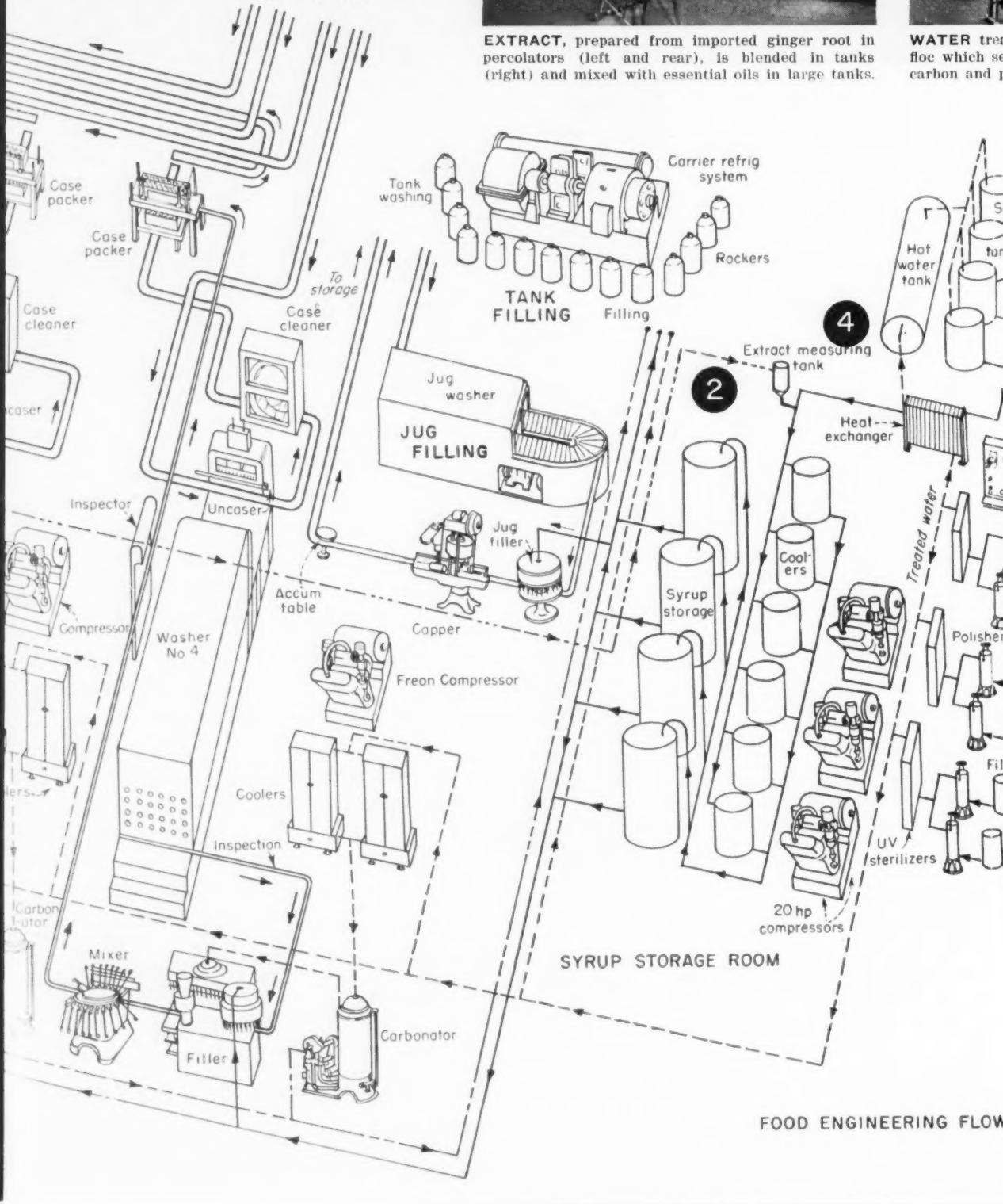
Refrigeration for water coolers at filling lines is furnished by individual Worthington Corp. Freon units. For cooling syrup in tanks in storage room, three 20-hp. compressors are employed. A Carrier unit in the tank-filling room produces chilled water for the plate syrup cooler and refrigeration for other plant uses.


AGING CELLAR
12 Ton liquid
CO_2 tanks
1
EXTRACT DEPT.
Inspector
Washer No.1
Compressor
Water Cooler
Inspection
6
Mixer
Filler
Carbon -ator
To fountain
5
Uncaser
Case cleaner
Case packer
7
Case packer
8
To palletizer No.3
Case dividers
No.2
8 oz
No.1
24 oz
9
Palletizers
SHIPPING
Case cleaner
Uncaser
Inspector
Compressor
Washer No.2
Inspection
Cooler
Mixer
Carbon -ator
Filler
Washer No.3
Inspection
BOTTLING

EXTRACT, prepared from imported ginger root in percolators (left and rear), is blended in tanks (right) and mixed with essential oils in large tanks.

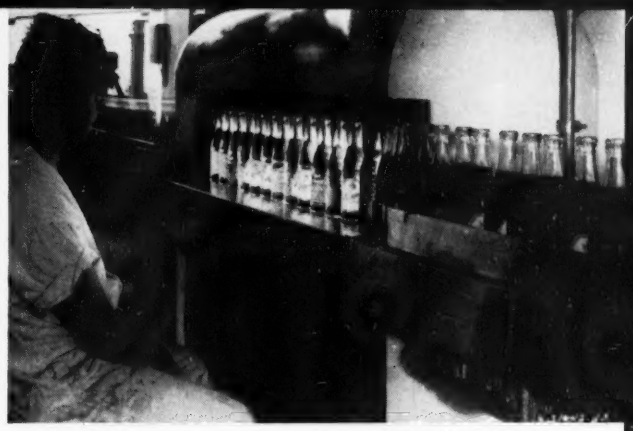
WATER trea floc which se carbon and p



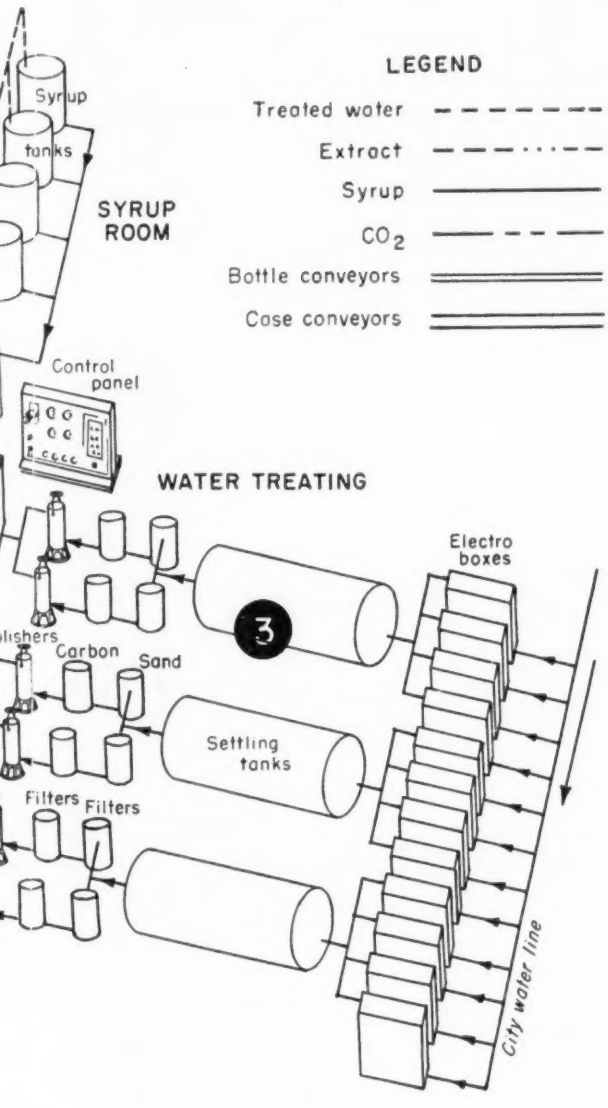


FOOD ENGINEERING FLOW

R treating system comprises electro boxes (right) that produce ich settles in large horizontal tanks. Then (r. to l.) come gravel, and paper filters, UV sterilizers.



FILLED BOTTLES are conveyed past light-through stations where inspector gives them final check-up on way from fillers to automatic case packers.



FLOWSHEET NO. 68

CHECKLIST OF EQUIPMENT

Water Treating

12 electro boxes—*Highland Park Steel Co.*
3-5,000 gal. settling tanks—*Buffalo Tank Corp.*
6 sand filters—*Automatic Pump & Softener Corp.*
6 carbon filters—*Automatic Pump & Softener Corp.*
6 polishers, 2,000 gal. per hr. Kwik Kleen—*Liquid Carbonic Corp.*
3 u-v sterilizers, Steritran—*Hanovia Chem. & Mfg. Corp.*

Syrup Making

4 cookers, 300 gal., stainless steel—*Cream City Boiler Co.; Stainless Steel Products.*
1 heat exchanger, APV plate type—*Walker-Wallace.*
2 pumps, 2,000 gal. per hr.—*Waukesha Foundry Co.*
2 filters—*Alsop Engineering Corp.*
1 Moyno feed pump—*Robbins & Myers, Inc.*
6 coolers, 300 gal., stainless steel, refrigerated jacket—*Stainless Products, Inc.*
4 holders, 1,000 gal., stainless steel—*Stainless Products.*
3 refrigeration units, 20 hp. Freon—*Worthington Corp.*

Jug Filling

1 gal. jug washer, 8 wide, 24 per min.—*Niagara Bottle Washer Mfg. Co.*
1 filler, 24 bpm.—*Horix Mfg. Co.*
1 capper (R. O. sealer)—*Aluminum Co. of America*

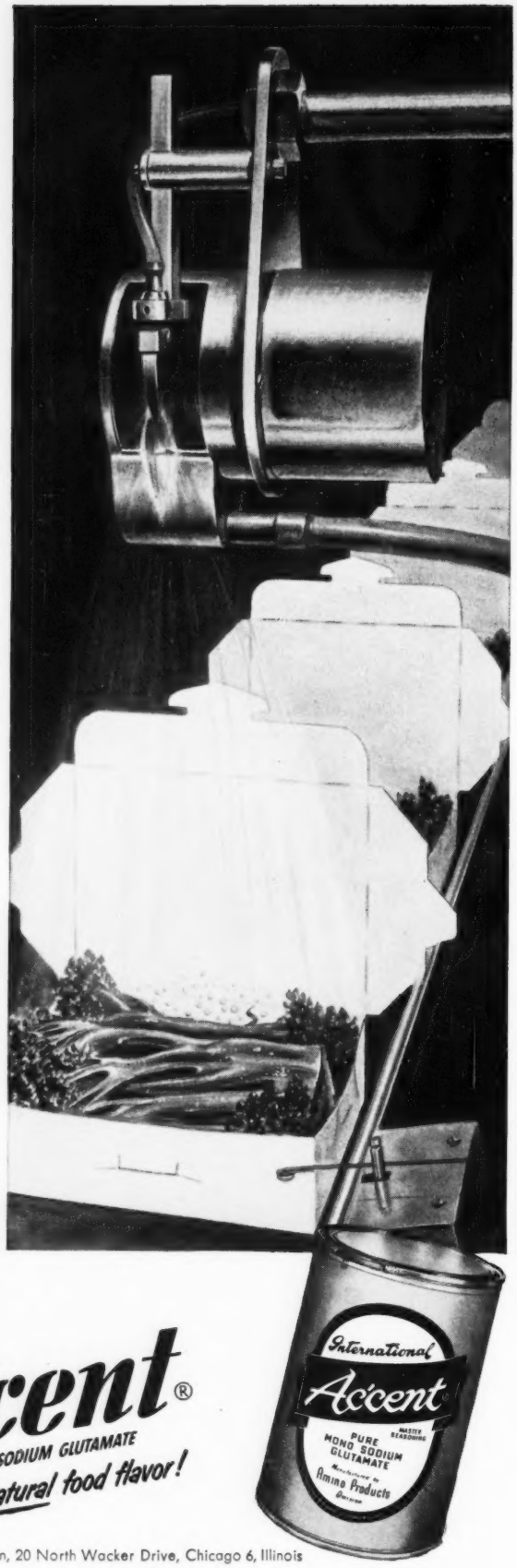
Bottling Room

3 full-depth uncasers—*Liquid Carbonic Corp.*
4 automatic magazine feeder tables—*Ditto*
2—32 wide (8-oz.) Superklean Hydro-Jet washers—*Ditto*
2—20 wide (qt.) Superklean Hydro-Jet washers—*Ditto*
2 double empty-bottle inspection units—*Ditto*
2 single empty-bottle inspection units—*Ditto*
4 combination L. P. fillers and crowners—*Ditto*
2—20 head spinner type mixers—*Ditto*
2—24 head spinner type mixers—*Ditto*
4—1,500 gph. deluxe recirculating carbonators—*Ditto*
6 No. 903 Red Diamond water coolers—*Ditto*
2 Freon compressors, 6HF 5-50 W—*Worthington Corp.*
2 Freon compressors, 6HF 4-75 W—*Worthington Corp.*
2 rotary filers, 36-in.—*Liquid Carbonic Corp.*
2 combiners, 328 bpm.—*Liquid Carbonic Corp.*
6 full bottle inspection lights—*Miller Hydro Co.*
4 case cleaners—*Standard-Knapp, Emhart Mfg. Co.*
4 automatic case packers—*Standard-Knapp.*

Additional Units: 2 automatic case dividers, 3 automatic palletizers, belt and roller conveyors (*Alvey Conveyor Mfg. Co.*); refrigeration unit (*Carrier Corp.*); 2 air compressors, carbon ring (*Ingersoll-Rand Co.*); 2 liquid CO_2 storage tanks (12 tons each), 1 cooling tower (on roof), 3 storage tanks in retail fountain, 6 electric fork lift trucks (*Lewis Shepard Sales Corp.*).

Here it is!

The new method of adding Ac'cent to frozen vegetables



New Ac'cent Machine gives flavor-edge to frozen foods

Now, after three years in the development stage, a new Ac'cent dispenser makes it possible for frozen vegetable processors to enjoy the flavor enhancement advantages of Ac'cent!

Accurate measurements of monosodium glutamate in a liquid solution are applied by the new machine to vegetables before freezing. It is an automatic, high-speed operation—efficient and economical.

The machine was designed and developed by Ac'cent technical experts in co-operation with a food engineering company. It is able to treat as many as 400 cartons a minute. There is no drip-loss, and it assures *uniform flavor control*. It also is versatile, for it can be used by canners and by processors of other frozen foods.

Use of the new machine brings *two immediate marketing advantages* to the frozen vegetable processor:

1. *Ac'cent*, pure monosodium glutamate, gives the product a distinct flavor advantage—a longer-lasting natural, fresh flavor.
2. *Ac'cent* gives the product a longer shelf-life because of the improved flavor retention.

The successful solution of this processing problem is another example of the help given to many of our customers by the exclusive Ac'cent technical service on new products, timing devices, applicators and a variety of processing problems. New developments from our laboratories have given many of them a lasting competitive advantage.

That's another reason why you should always specify Ac'cent when buying monosodium glutamate. You get so much more when you do!

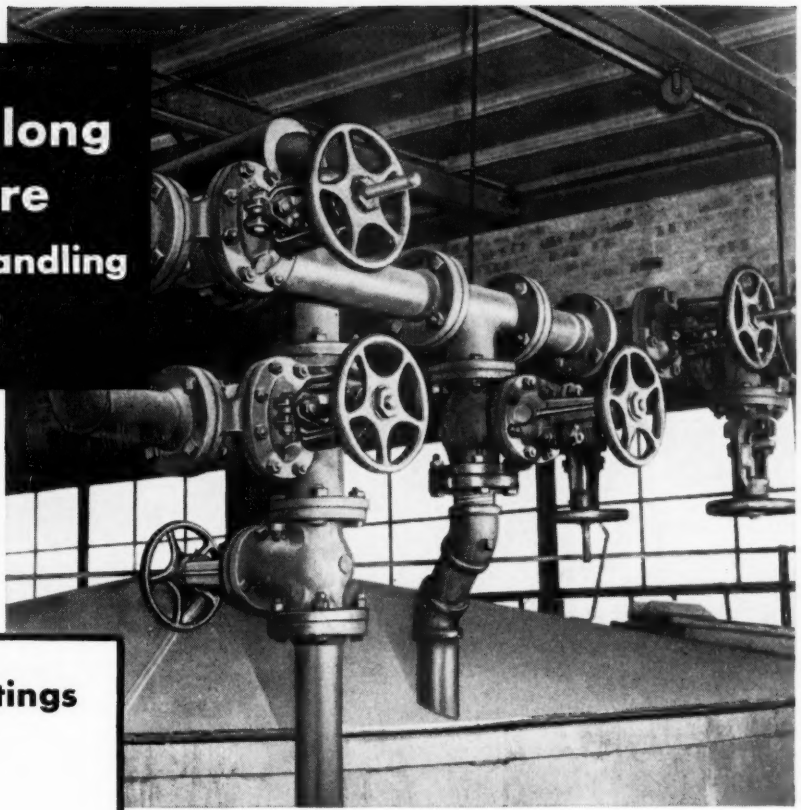
Ac'cent®
PURE MONOSODIUM GLUTAMATE
...builds natural food flavor!

Full information about the new Ac'cent liquid dispensing machine will be sent upon request.

AMINO PRODUCTS Division of International Minerals & Chemical Corporation, 20 North Wacker Drive, Chicago 6, Illinois

Valve with a long bright future

...in oil and fats handling for instance



The Installation

At Swift & Co. technical products plant in Hammond, Indiana, where hundreds of Crane valves are handling vegetable and animal fats, various fatty acids, acid foots, etc., in storage and preparation sections.

Valve Service Ratings

SUITABILITY:
Stopped former trouble

FEATURES:
Stainless Steel trim

MAINTENANCE COST:
Zero

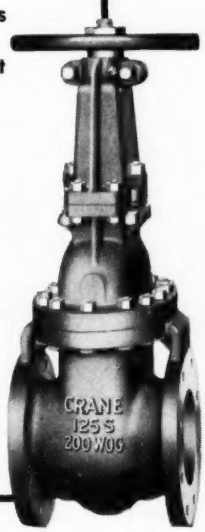
SERVICE LIFE:
No sign of wear after 3 years

OPERATING RESULTS:
Accurate control—clean plant

AVAILABILITY:
Crane Branches Everywhere

The Valve

It's the familiar, universally-used Crane 125-Pound OS&Y Iron Body Wedge Gate, but equipped with special Crane 18-8 SMo stainless steel trim to resist the mildly corrosive effects of fatty acids and acid foots. If you have a similar problem, this may be your solution. Ask your Crane Representative to help you.



The Case History

The plant had been operating about two years when the Crane valves were installed. They were selected to replace the plant's original valves which were not maintaining the required absolute tightness when process pipe lines were shut off.

The Crane valves, now in service for more than three years, are iron body gates with stainless steel trim. Recently the plant reported: no leakage . . . no maintenance . . . no replacements. Also credited to the Crane valves: more accurate control of processes . . . and a much cleaner plant.

THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
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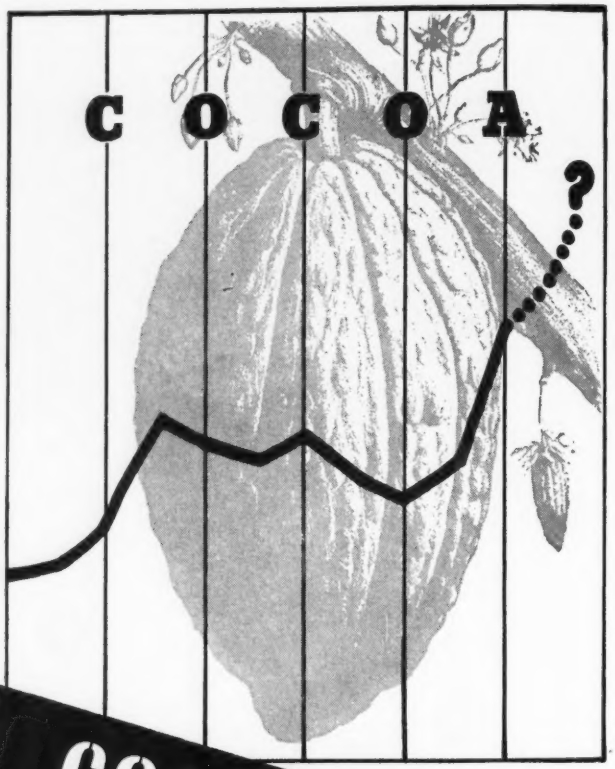

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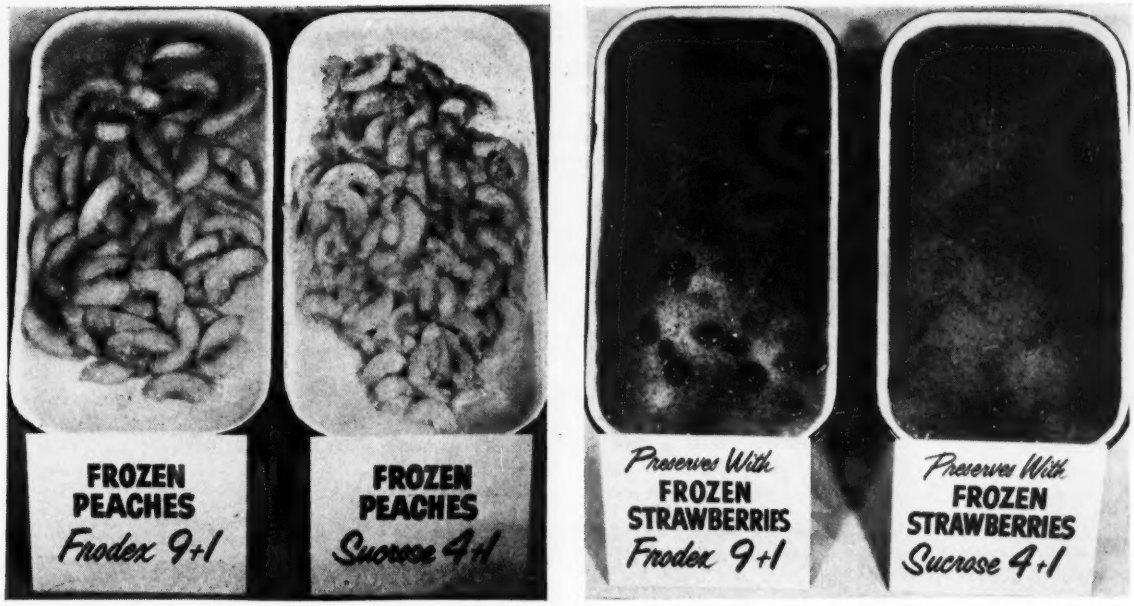
FROZEN PEACHES Frodex 9+1
FROZEN PEACHES Sucrose 4+1
Preserves With FROZEN STRAWBERRIES Frodex 9+1
Preserves With FROZEN STRAWBERRIES Sucrose 4+1

HOW granular corn syrup solids improve quality of frozen fruits and preserves made from them. Left: Comparison of '53-pack thawed Freestone peaches. Right: Preserves made from '53-pack frozen strawberries.

Better Frozen Fruits With New Corn Syrup Solids

Large grain product applied as cap to bulk fruit prevents oxidation during thawing. Gives preserves of superior color, flavor, texture

PHILLIP E. GILBERT
Formerly Laboratory Director, Tea Garden Products Co., San Leandro, Calif.

Capping fresh fruit with granular corn syrup solids at time of packing offers the fruit freezer numerous benefits.

- **It prevents oxidation of fruit during thawing and prior to subsequent use.**
- **It enables production of preserves with flavor, color, and texture superior to those made from 4+1 sucrose packs.**
- **It effects a saving of approximately 10% in container, storage, handling, and freight costs.**

Secret of effectiveness of the method is a new product—*granular* Frodex—developed by American Maize-Products Co. specifically for use in bulk packs (10-30 lb. cans and 500 lb. barrels and drums) of frozen fruits.

This product has a particle size somewhat larger than coarse granulated sucrose, and it is less hygroscopic than the powdered Frodex used in ice cream and confections.

A limited size commercial pack of strawberries, peaches, and apricots with Frodex was made by Tea Garden Products Co., San Leandro, Calif., in 1952, for its own use in making preserves. Results of this pack, and quality of preserves made from it, were so successful that Tea Garden prepared a larger pack in 1953.

Primary problem revolved around the question of how much Frodex should be used per pound of fruit and the method of application. First tests were conducted with strawberries, in which the granular product was intermixed, replacing sucrose on a pound-for-pound basis at a standard 4+1 ratio. Control packs using sucrose (4+1) were prepared for comparison.

After thawing, fruit in the Frodex sample was found to have a more noticeable sheen and a more turgid nature than the sucrose pack. Because of the relative sweetening values of corn syrup solids with respect to sucrose, no flavor evaluations were attempted.

Subsequently, full scale batches of preserves were made from these packs and resulting products were submitted to a trained taste panel for evaluation (see Table I). Color of both samples was rated the same. Flavor and texture of the Frodex sample were rated below the sucrose pack. It was assumed that the 4+1 ratio permitted excessive moisture to remain in the berry and, as a consequence, resulted in a soft textured fruit in the preserve.

Capping Method Tried

With this thought in mind, another test pack of strawberries was made using dry corn syrup solids at a ratio of 28+2 with 2 lb. of Frodex used to cap 28 lb. of fruit in a 30-lb. tin. This method was suggested by observing a packer pouring corn syrup on top of filled cans to provide a seal against oxidations. A control pack was made with sucrose in the same manner and identical ratio. In addition, a 4+1 sucrose sample afforded reference.

AUTHENTICATED

CASE HISTORY

From the current files of Hoerner Boxes, Inc.

Re: Bettendorf Oil Burner Company
(Division of The Lennox Furnace Company)

BREAKAGE ELIMINATED and MONEY SAVED through improved packaging*

Distortion and breakage of burners in transit were serious problems for the Bettendorf Oil Burner Company of Marshalltown, Iowa, before a Hoerner Packaging Engineer came to the rescue. He designed a special pad to support the burner at the five most critical points, and two die-cut scored pads to securely anchor the burner within the box. Result — burners now arrive intact and Bettendorf saves the money they used to spend on replacing and reshipping damaged parts and burners. Lennox Dealers are happier too — now that Hoerner has eliminated the breakage problem.

*The Hoerner Packaging Engineer responsible: F. C. Supinger

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If your company packages things, whatever they are, ask a Hoerner Packaging Engineer to come in and make an objective study of your packaging operations. It won't cost you a cent or obligate you in any way. And it most likely will mean an increased margin of profit through savings in labor and material costs, prevention of shipping losses. Just write to one of the Hoerner plants listed below. Your letter will receive our prompt attention.

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GENERAL OFFICE: 600 Morgan Street
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AFFILIATES—Keokuk, Des Moines and Ottumwa, Iowa
Sand Springs, Oklahoma; Minneapolis, Minnesota
Fort Worth, Texas; Sioux Falls, South Dakota
Fort Smith and Little Rock, Arkansas

Packaging Engineers Designers and manufacturers of corrugated boxes.

Upon thawing, the three packs were compared with respect to color and texture. Even with this reduced ratio, the Frodex sample had a brighter sheen than the 4+1 sucrose pack. Fruit of the 28+2 sucrose control was oxdized and dull in appearance. There was no apparent difference in texture of the Frodex pack as compared with the sucrose (4+1) pack. However, the control sucrose pack was found to be quite inferior.

At this point it was noticed that the top portion of the fruit in the Frodex sample was completely sealed over with thick viscous corn syrup. This cap had protected the fruit from oxidation.

Full-scale batches of strawberry preserves were made from these samples and resulting product submitted to the same taste panel as before (see Table II). Preserves prepared from the corn solids pack were found to be superior to the others in respect to color, flavor, and texture. In these three categories, preserves made of fruit frozen with this new material scored 31 out of 33 possible first choices by eleven tasters.

Since the 28+2 Frodex preserves were better than either the 28+2 or the 4+1 sucrose products, more strawberries were made into batches of preserves to verify initial results. Subsequently, a ratio of 27+3 of fruit to Frodex was found to form a more effective cap than the 28+2. Preserves made from the new ratio were essentially the same as those of the previous 28+2 pack.

Peaches and Apricots

A control sample of clingstone peaches was packed using 26 lb. of fruit to 4 lb. sucrose and containing 2,600 mg. ascorbic acid (100 mg. per lb. fruit). Cans were filled ¾ with fruit only and the remaining ¼ with fruit intermixed with ½ of the sucrose-ascorbic acid. Remainder of sucrose-ascorbic acid mixture was put on top of fruit to protect it from oxidation.

Test sample was packed with 27 lb. fruit capped with 3 lb. Frodex. No ascorbic acid was used in the test pack. Samples were frozen, stored for a few weeks, then allowed to thaw. To avoid undue heat shock, which could occur during the preserve process, samples were allowed to defrost until most of the ice had disappeared. By comparison it was found that the sucrose-ascorbic acid pack was noticeably oxidized to a depth of 1-1½ in. Frodex capped pack did not show any oxidation.

Preserves were made from the samples and submitted to the taste panel for evaluation (Table III). Color and flavor of corn syrup solids capped pack were rated appreciably above those of sucrose-ascorbic acid pack. Texture of former was also better, but not as outstanding as its color and flavor.

To determine degree to which the cap had protected peaches from oxidation, controlled tests were made under identical defrosting times and conditions. Three samples were used: (1) Sucrose-ascorbic acid pack, (2) Frodex capped pack, and (3) a sucrose-ascorbic acid pack with an addition of 100 ppm. sulfur dioxide.

After thawing, the sucrose-ascorbic acid and capped packs were identical with previous findings. Sulfur dioxide pack showed no oxidation, but the fruit was noticeably lacking in luster, having dull appearance in the top 1½ in. Major difference between Frodex and sulfur dioxide pack was luster of the fruit.

Preserves were made from these samples and submitted to the panel for color grading only. Results indicated that, by capping peaches with Frodex, oxidation was retarded to at least the same degree as by packing with sulfur dioxide at the rate of 100 ppm.

Apricot samples were packed with syrup solids in the ratio of 27+3 along with a control 4+1 sucrose pack. Results were nearly identical to those of the peach pack in so far as physical preserving effects natural color and texture of the fruit. No flavor comparison was made before preserving because of differences in relative sweetness of the two packs. Frodex sample had a much brighter color and sheen after thawing than the sucrose one. Cap was intact and, because it com-

(Turn to page 167)

"Granular" Turns the Trick

Packers of bulk frozen fruits long have been aware of the advantages of liquid corn syrup as a packing medium:

Fruit so packed before freezing retains a bright color, fresh flavor, turgid texture, and high drained weight.

These effects primarily are due to the average higher molecular weight of corn syrup as compared with sucrose. But, because of its greater ease of handling, sucrose is still largely used.

Powdered Frodex, being highly hygroscopic, did not lend itself to easy handling in freezing plants. Nor were food freezers inclined to make the capital investment required for corn syrup or corn syrup-liquid sucrose handling systems. Also, corn syrup adds a small percentage of water to the pack which is not desirable.

To overcome the above difficulties inherent in corn syrup and powdered Frodex, American Maize-Products Co., developed a new process that gave a granulated product.

And from first tests it became obvious that the increased particle size decreased the product's hygroscopicity to a point where it could be handled in the average freezing plant with little more difficulty than sucrose.

Comparisons of Sucrose and Corn Syrup Solids-Pack

TABLE I—STRAWBERRY PRESERVES Made From 4+1 Sucrose Pack Fruit Were Superior to Those From Similar Corn Syrup Solids Pack

Sample	Color	Flavor	Texture	Average
Sucrose (4+1)	6.9	6.9	6.5	6.8
Frodex (4+1)	6.6	6.1	6.0	6.2

TABLE II—CORN SYRUP SOLIDS PACK STRAWBERRIES Made Preserves With Better Color, Flavor and Texture

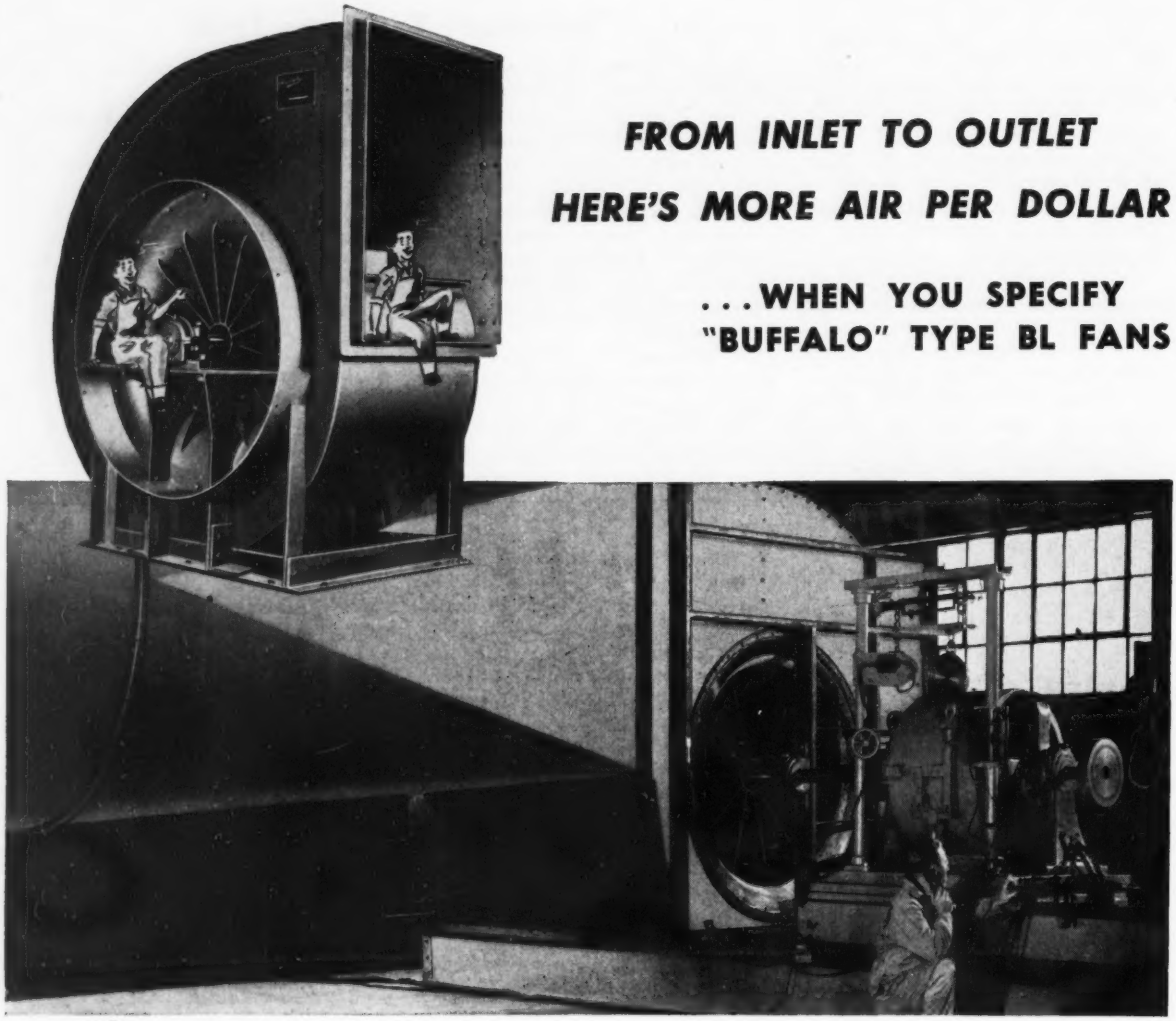
Sample	Color	Flavor	Texture	Average
Frodex Cap (28+2)	8.3	7.9	8.3	8.1
Sucrose (4+1)	6.9	6.9	6.5	6.8
Sucrose Cap (28+2)	6.9	6.5	5.2	6.1

TABLE III—COLOR and FLAVOR of Preserves From Corn Syrup Solids Capped Peaches Was Superior to Those From Sucrose-Ascorbic Acid Pack

Sample	Color	Flavor	Texture	Average
Frodex (27+3)	8.4	8.6	7.5	8.2
Sucrose (26+4)	7.2	6.7	6.9	6.9

TABLE IV—APRICOTS Frozen With Corn Solids Cap Made Better Preserves Than Those Packed With Sucrose

Sample	Color	Flavor	Texture	Average
Frodex (27+3)	8.2	8.5	8.5	8.4
Sucrose (4+1)	7.0	6.9	6.8	6.9



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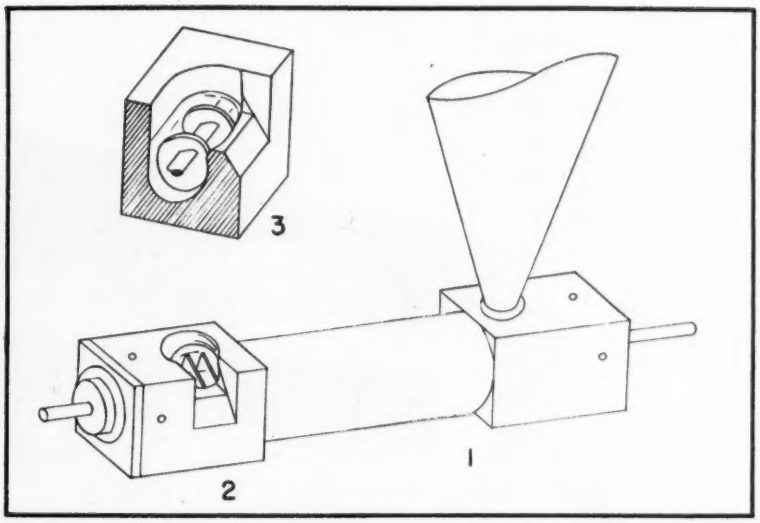


DETAILS ON EQUIPMENT: Left: Assembly for delivery of peanut oil as carrier for vitamin A is comprised of (1) gear-type pump, (2) variable speed drive, and (3) oil reservoir. Right: Salt and granulated hard fat were handled in this type feeder. Material is put in at (1), and it discharges via end (2), which is shown in cross section at (3).

CONTINUOUS ENRICHMENT

Of Peanut Butter With Vitamin A

Details of Process and Fortifying Equipment Revealed by SRRL

R. K. WILLICH and A. F. FREEMAN
Southern Regional Research Laboratory, USDA, New Orleans

Continuous manufacture of peanut butter fortified with vitamin A now is commercially feasible.

This is confirmed by results in work carried out by Southern Regional Research Laboratory, New Orleans, where it was demonstrated that a notable uniformity of the vitamin could be attained in the finished product.

How the work proceeded:

In making peanut butter, careful control of feeding mechanisms that govern ultimate composition of the finished product is essential from the standpoint of product uniformity. However, no suitable feeding devices for incorporating vitamin A in peanut butter were included in the equipment comprising the pilot plant at the SRRL. Hence, it was necessary to modify existing equipment.

Equipment Detailed

All ingredient feeders were installed to discharge direct into a common supplier leading to the grinder. Thus, some mixing of ingredients was obtained before grinding.

A Zenith* gear-type pump, consisting simply of a center plate and two counter-rotating gears that displace liquids at a rate proportional to the speed of the gears, was used to deliver peanut oil as the carrier of vitamin A palmitate. This pump was operated by a variable speed drive that permitted adjustment of delivery rate over a range from 0 to 50g. of peanut oil per minute. A reservoir to hold the oil was used to supply the pump.

Three screw-type feeders for delivering roasted peanuts, salt, and hydrogenated peanut oil to the grinder were designed and constructed at SRRL. Each was linked to a variable speed drive, so that delivery rate of each material could be adjusted. Rate could be regulated over a range from 0 to about 5 kg. (11 lb.) per min.

Two smaller feeders, identical in size and design, were used to feed granulated hydrogenated peanut oil or salt.

By discharging the salt or granulated hard fat from the top side of the feeder, variations observed during low rates of delivery were eliminated. One of these feeders was adjusted to deliver granulated hydrogenated peanut oil over a range from 0 to about 46g. per min. while the other feeder was set to deliver salt over a range from about 10 to 60g. per min.

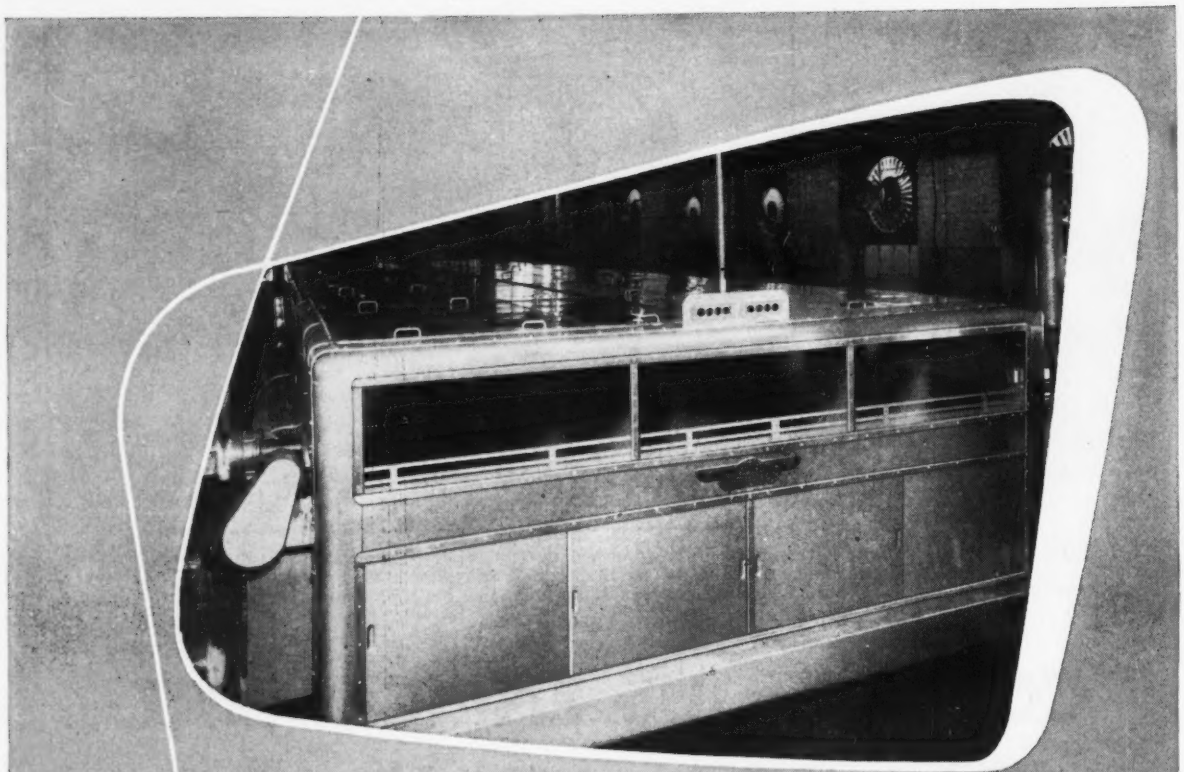
Particle Size Important

Since uniformity of delivery by volumetric displacement is dependent, among other things, upon uniformity of particle size, it was found necessary in the cases of salt and hydrogenated peanut oil to prepare these materials so that their particle sizes would be nearly uniform.

Accordingly, the commercial, flaked hydrogenated peanut oil was first chilled, then passed through a mill (No. 1 Wiley) equipped with a 2 mm. screen. To prevent clogging on the screen after prolonged use, small quantities of dry ice were ground along with the hard fat. The granulated material was sieved, and the material passing a U. S. standard sieve No. 20 and retained on a No. 30 sieve was used for measurement of rate of delivery.

Commercial "flour ground" salt was

* Mention of trade names by the authors is for identification only and is not to be construed as implying USDA endorsement.



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For The Best Foods Inc.

When The Best Foods Inc., Norfolk, Va., expanded their plant facilities and increased the degree of mechanization, a B-W Vortex Pasteurizer was part of their new production plan. They found the following definite advantages of the Vortex made it a profitable investment:

- Compactness of the Vortex allowed increased expansion without additional building.
- Bottle pre-heating and better automatic control decreased breakage loss and did a more uniform pasteurizing job.
- Absence of steam vapors and heat made for better working conditions.

Mechanization of production facilities—of which the Vortex was a part—saved time and labor, stepped up production. The Best Foods Inc., found their Vortex "walking beam," spray type, automatic pasteurizer profitable, even though run only four months a year.

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sieved as received. The salt that passed a U. S. Standard Sieve No. 30 but was retained on a No. 40 sieve was used in the delivery-rate measurements. In each instance, oil and salt particle sizes selected were major fractions obtained during sieving.

Delivery of roasted nuts was determined with split-blanched peanuts as customarily prepared* for the manufacture of peanut butter.

Material supplied to each of the feeders was contained in hoppers of appropriate size (see Table I) mounted directly over the intakes of the feeders.

Delivery measurements were determined independently on each material while each feeder was operating continuously at constant shaft speed, and at ambient temperature of about 80 deg. F. Results of these measurements are shown in Table II.

TABLE I—FEEDER Specifications, (Type, Use, and Capacity)

	Feeders			Hopper or Reservoir (Inverted Cone)			
Type and Use	Effective Barrel Length	Bore	Pitch	Height	Top I. D.	Bottom I. D.	Volume
	In.	In.	In.	In.	In.	In.	Gal.
Screw, for roasted, split, blanched peanuts	11	2 1/2	1	29	44	2	66
Screw, for hydrogenated peanut oil or salt	8	1	1/2	13	7 3/4	1	1
Gear pump,[1] for peanut oil (containing vitamin A)	....	....	....	13	12	3/8	2
Screw,[2] for all of above materials	10[3]	2 1/2	1	....	....	....	....

[1] Of commercial manufacture. [2] A portion of grinding mill. [3] Approximation

TABLE II—DELIVERY Measurements of Different Materials

	Peanuts			Additives		
	Runner	Spanish	Spanish	Salt	Hydrogenated Peanut Oil	Peanut
Materials, amount in hopper	45–0 kg.[1]	95–85.5 kg.[2]	95–0 kg.[1]	3.5–0.15 kg.[1]	1.8–0.2 kg.[2]	3.0–0.8 kg.[1]
Delivery per 5 minutes[4]						
Maximum	8.92 kg.	9.54 kg.	9.50 kg.	140.6 g.	194.0 g.	90.4 g.
Minimum	8.88 kg.	9.43 kg.	9.38 kg.	137.5 g.	187.1 g.	90.0 g.
Average	8.90 kg.	9.48 kg.	9.46 kg.	139.4 g.	190.7 g.	90.1 g.
Number of observations	5[5]	24	10	24	24	24
Av. delivery rate, per min.	1.78 kg.	1.90 kg.	1.89 kg.	27.88 g.	38.14 g.	18.0 g.
Shaft speed, rpm.	120	123	123	8	25	66
Approximate particle size	....	....	....	420–590 μ[6]	590–840 μ[6]	....
Approximate density	0.58 kg./l.	0.60 kg./l.	0.60 kg./l	(1.2 kg./l.)	(0.54 kg./l.)	0.9 g./ml.

[1] Supply unreplenished during test. [2] Supply maintained during test. [3] Supply replenished when low during test. [4] During constant operation of equipment. [5] Experiment repeated three times with no significant variation. [6] μ means micron.

Delivery vs. "Head"

When a nearly constant weight of 95 kg. (208.5 lb.), or "head" of Spanish peanuts, was maintained in the hopper above the feeder, weights of the series of 24 samples (Table II, Col. 2) showed a delivery-rate range of 9.43 kg. to 9.54 kg., or an average of 9.48 kg. (21 lb.) of peanuts delivered per 5 min.

Under the same shaft speed, (123 rpm.) but with a diminishing supply or "head" of peanuts contained in the hopper until emptied, no appreciable difference was found in the average delivery rate on discharging all of the 95 kg. of peanuts from the hopper.

Delivery rates also were determined at slightly decreased shaft speed (120 rpm.) on the same feeder using runner peanuts. Results of these measurements obtained under diminishing supply, or "head", of peanuts contained in the hopper are shown in the Table II, Col. 1.

Measurements of delivery of peanut oil with the gear-type pump are shown

(Turn to page 166)

* Willich, R. K., Hall, A. S., Morris, N. J., and Freeman; A. F., "Peanut Butter—I. Roasting, Cooling, Blanching, and Picking of Peanuts," *Food Technology 6*, 71, (1952).

A Look at the Factors Behind This Vitamizing Move

Putting vitamin A in peanut butter is seen very desirable from a nutritional standpoint, because peanut butter as a spread supplements or replaces butter or margarine, both of which contain substantial quantities of vitamin A.

Furthermore, the Armed Forces desire, as a field ration, peanut butter that has been fortified with vitamin A.

Such rations generally are deficient in this substance, which is essential for normal growth and maintenance of high visual acuity, resistance to infection and fatigue, and proper healing of wounds and fractures. Peanut butter, because of its high oil content[1] and good keeping properties[2], could serve as an excellent carrier for oil-soluble vitamin A.

Accordingly, SRRL undertook the present work of providing technological information about the incorporation of the vitamin A.

While references to peanut butter fortified with vitamin A have appeared in the literature, no information had been noted indicating that a process for continuous manufacture of such a product has been developed.

Recommended daily dietary allowance[3] of vitamin A is 5,000 International Units for an adult. Although vitamin A deficiency is considered uncommon in the United States, Krehl[4] points out surveys indicated considerable proportion of the population does not receive the recommended amounts. This allowance also takes into account the premise that approximately two-thirds of the vitamin A value of the average diet in the U. S. is contributed by carotene, and that carotene has half, or less than half, the value of the vitamin[4].

Peanut butter, which now accounts for the consumption of more than 250 million pounds of peanuts annually, further offers means of increasing the amount of vitamin A in the U. S. dietary because of its general popularity and its inclusion in the school lunch program. Currently, it is not added to peanut butter as a nutritional supplement as in the case of other foods, such as margarine, although peanuts, the principal ingredient of the product, contain virtually none of the vitamin[5].

[1] Morris, N. J., Willich, R. K., and Freeman, A. F., "Peanut Butter—III. Effect of Roasting, Blanching, and Sorting On the Content of Oil and Free Fatty Acids of Peanuts," *Food Technology*, **7**, 366 (1953).

[2] Willich, R. K. Morris, N. J., and Freeman, A. F., "Peanut Butter.—V. The Effect of Processing and Storage of Peanut Butters on the Stabilities of Their Oils," *Food Technology 8*, 101 (1954).

[3] Food & Nutrition Board, National Research Council, *Recommended Daily Dietary Allowances*, revised (1948).

[4] Krehl, W. A., "Vitamin A—I. The Visual Process", *Borden's Review of Nutrition Research, 13*, p. 49 and p. 66, (1952).

[5] Pickett, T. A., *Vitamins in Peanuts and Some of Their Products With Special Reference to Vitamin B₁ and the Pellagra-Preventive Factor*," Georgia Exp't Sta., Circ. 128, (1942).

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Meat Fat Improves Frozen Dessert

Quality oleo fat shown to enhance stability, resist "churn-out" when used in making non-butterfat frozen product . . . New test, rigid scoring system offer proof

M. E. HULL
Research Division, Armour and Company, Chicago

Technical progress in processing meat fat has opened yet another door to the use of this natural ingredient in foods—this time in the rapidly growing field of non-butterfat frozen desserts.

To date such products generally have employed vegetable oils. And this is only natural, since most of the states pioneering this dessert, known to many as "mellorine", are in the great seed-oil growing area.

Armour and Company, as a producer of both meat and vegetable fats became interested in the possibilities of utilizing its meat fats in the production of these products.

The right type of meat fat to use was pinpointed through a specially developed test and taste panel. And it was quickly demonstrated that this ingredient not only produced a highly acceptable product by regular commercial routine, but also offered positive resistance to churning-out during freezing, which is a problem with other fats.

Before detailing the procedure leading to this discovery, let us consider the growth of these frozen dessert products and the type of fats that have been employed in them.

While the term "frozen dessert" is used by many to indicate the non-butterfat product, these words still are open to connotation as a general description of ice cream and similar products. Hence, the coined term "mellorine" has been adopted by several states as well as by the International Assn. of Ice Cream Manufacturers to specifically describe the non-butterfat dessert and thus avoid confusion.

Actually, ice cream manufacturers themselves have been making mellorine for about six years and have found, in general, that it has been reaching a new market. This is borne out by production figures comparing mellorine and ice cream. In 1952 there was an 11.4% increase of both products over the previous three years average ice cream production in Texas, Oklahoma, Missouri, and Illinois.

Several types of fats have been used, including domestic (hydrogenated cottonseed and soya) and foreign (hydrogenated and non-hydrogenated coconut) vegetable fats.

Commonly, the above fats are used as such or blended together. By hydrogenating (hardening) the vegetable fats it is possible to vary their melting points to meet the range of from 76 to 120 deg. F., as desired in mellorines.

New-Type Test

In the effort to improve ingredients for this market it soon became apparent that the making of mellorines from all the possible fats and their combinations, and then evaluating them, would be a major project in itself.

However, preliminary steps toward this procedure indicated that a method of correctly judging the flavor of fat was of first importance. Assumption was that only fats with particularly bland or neutral flavor would be considered.

The first method used for evaluating the flavor of a fat was the standard one employed by oil taste panels for controlling flavor for commercial use. This consisted in offering samples of the melted fat to trained tasters, who scored it against a control sample.

But when this technique was applied to fats for mellorine it was found that occasionally a fat with a good score did not produce equally good flavor in the frozen product. Apparently the emulsification of the fat into milk

(Turn to page 152)

Sample Fat→ is scored against control by Armour taste panel. It's evaluated in special 10% emulsion of fat and skim milk.

NEW easy-opening wrap
SERVES AS HANDY CONTAINER

CROSS-TAPE UNIT
applies opening tape to large as well as small packages

Consumers really appreciate thoughtful, convenient packaging. It builds good will—*and sales*. With the new cross-tape unit, developed for our wrapping machines, you can give your product a wrap that zips open neatly—and can be used as a protective container for the unused portion of its contents.

The cross-tape unit accurately locates cellophane tape *in any desired location* in relation to the length of the package. It measures, cuts and affixes tape to the inside of the wrapper. Tape goes around the entire girth of the package with one end protruding as a pull-tab. To make tearing easy, short slits are cut in the wrapper on each side of the pull-tab.

Installation of the cross-tape unit on our wrapping machines in no way affects the speed of operation or size range.

Write for complete information

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS

NEW YORK PHILADELPHIA BOSTON
CLEVELAND CHICAGO ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO
SEATTLE TORONTO MEXICO, D.F.

Placing tape near end of package keeps the main portion of the wrapper intact after opening. When no carton is used, as in the case of this paper napkin package, the opened wrap alone serves as a container for the unused contents.

Practical Management

—*Continued from page 96*

with or without assistance from the parent organization. Classes meet at night in such studies as public speaking, report writing, electrical wiring, power plant engineering, mechanical drawing, practical psychology, and economics.

Instruction is through university extension courses, state adult education, local schools, or by other special arrangements. Occasionally, adequate instructions on certain subjects can be obtained within the company, or from an expert in a neighboring company.

Cost Nominal

Association dues are $4 per year per member. Some members (probably less than half) pay their own way and consider values received large in proportion to the investment. On the other hand, the bulk of the dues are company paid as a profitable corporate investment. Some companies also absorb part or all of the cost of monthly dinner meetings.

Especially when classes are large, enrollment in the courses is at nominal cost to the individual. Often, of course, arrangement is made whereby the company pays the fees upon satisfactory completion of the work by the enrollee.

"Really Has Paid Off"

Now, what is the report of those at the foreman-supervisory level who have given many nights during recent years to NAF classes and activities? Here is the answer of one of those interviewed, expressing the general view—

"Not everyone in our company who is eligible has joined our foremen's club. However, no one has been fired for not joining.

"I knew from the start there was a lot about my job I didn't know. I joined NAF gladly. Nobody made me. I wanted to learn—wanted to get to know the rest of those in the company doing management work, and thus get an idea how they did their jobs.

"For some of them NAF really has paid off. I would say that in less than five years somewhere between 6 and 8% of our group has gone on up to staff executive jobs and other brass positions much beyond their line-foreman or supervisory jobs.

"Sure, I hope to climb higher, too. I'll keep working and studying to make myself capable—to be ready if a chance comes for me to move up.

"What if I don't get promoted—never get beyond where I am? Well, let me tell you this: I'm on top of my present job, and that's more than I could say a few years back. It means plenty to me to know, as I do now, that I measure up to my job better than most. And that's assurance—not conceit. So, if I get no more than that reward for my efforts in NAF, it has been a good bargain.

Corporate Dividends

What are the reports on the worth of NAF to top management and the corporation?

Take Company A. When it suffered an accident entailing loss of 13,000 man-hours, its NAF members mounted a drive to eliminate lost-time accidents. And they were curbed within four months—to be followed by a year and half in which not one man-hour was lost due to an injury.

Company B's accident frequency in 1947 was 31.2, against the national average of 15.2. Then the company NAF went into action. By 1953, when the company ran up 19,000,000 man-hours, the accident frequency rate had dropped to 2.6, as compared to the national average of 10.3.

In Company C rejects due to off-quality were at a costly high. Top management called attention to the situation, and the NAF Club went to work. Within four months rejects were cut 40%.

The next project, voluntarily adopted by the Club, was an attempt to reduce costs of factory supplies. Once the program was under way, expenses of supplies were cut 30%.

One NAF accomplishment likely stands as unique in industrial episodes:

Prior to 1948, the executives of Company D experienced real difficulty in contract negotiations and great dissatisfaction with the results. All this despite calls upon legal aid and outside consultants.

In desperation, the company assigned the job of contract negotiation to the foremen members of its NAF Club. And since then, the top executives have been very well satisfied. Contracts have been worked out with a minimum of friction and duress.

In the words of the executive vice-president, NAF foremen are "doing a better job on contracts than ever was accomplished by any of our so-called hot-shot experts."

In view of these and similar achievements, it is evident that NAF truly offers members A-1 training. And NAF headquarters has revealing figures that bear witness: For the average non-NAF industrial foreman, a pay increase of approximately 2% a year and a merit promotion every 8 to 12 years is the expectancy. However, the NAF foreman "generally increases his pay about 8% a year and earns a merit promotion every 36 to 40 months."

4 Special Features

Among other services, the association supplies—

1. Field service managers, who help clubs with their educational programs
2. A monthly magazine devoted to the advancement of management
3. A large traveling library
4. Two paid speakers per year for each affiliated club

Granted, such training facilities as are offered through NAF, or their near equivalents, can be obtained from other sources. But these elements alone are far from being the whole story. By themselves they lack the essential ingredients of NAF, which "creates the proper atmosphere in which all kinds of industrial management programs grow and prosper".

SPECIAL COMING IN SEPTEMBER

In the next issue of FOOD ENGINEERING, a special insert will be devoted to the great meat branch of the food industry.

A pioneer in industrial efficiency, meat packing now is experiencing a new surge of advance in processing and packaging methods.

This September section will discuss such advances and look to such future developments as cold sterilization by radioactive fission materials.

This Special is not for meat men only. It will be of interest and value to the other branches of the industry because of a common interest in the functions, operations, products, and markets involved.

In addition, the September issue will carry 12 to 15 feature articles on developments in the many other branches of food manufacturing. And these will cover the industry-wide subjects of Sanitation, Quality Control, Instruments, Packaging, Materials Handling, Maintenance, Plant Engineering, Processing, Personnel, and Transportation.

If you have any problems or opportunities for improvement in any of your operations—and who hasn't?—you will get help from the September FE.—The Editors

WORRIED ABOUT WHERE TO PUT YOUR BOILER INSTALLATION?

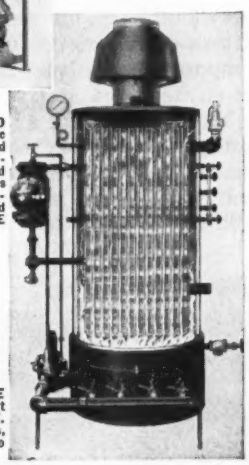
The KANE VERTICAL BOILER PACKAGE IS YOUR ANSWER . .

. . . chances are that floor space is at a premium in your shop or plant . . . if so, you needn't be robbed of this valuable space by a cumbersome, horizontal type boiler . . . not when a KANE *vertical* BOILER PACKAGE will give you the same or probably better results.

The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

"Engineered Steam at its best, with over 50 years of experience at your disposal!"

Full details in new KANE Bulletin, No. 2K.



The M-K-O Automatic Boiler Feed returns condensate and supplies make-up water as needed to the KANE boiler.

The KANE Boiler, built to A.S.M.E. specifications, in sizes to 30 H.P.

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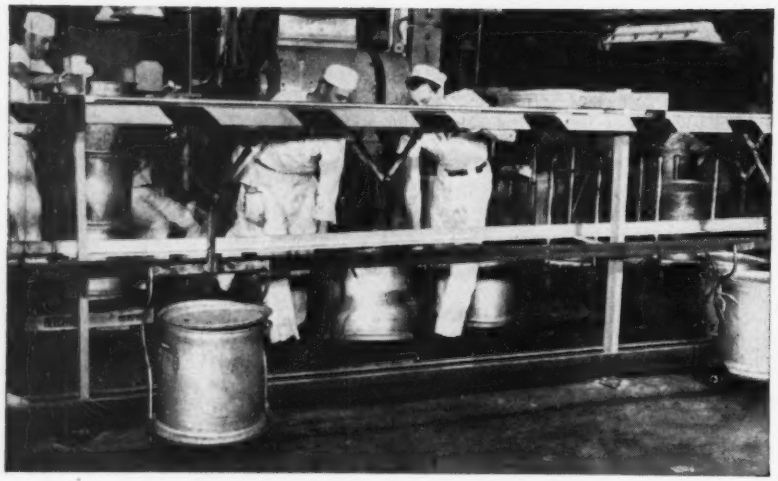


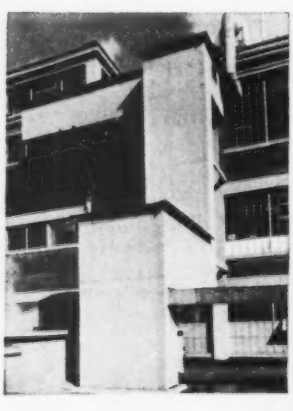
• Stock pots of freshly cleaned vegetables being placed on "Zig-Zag" Conveyor racks for trip to straining and cooking department.

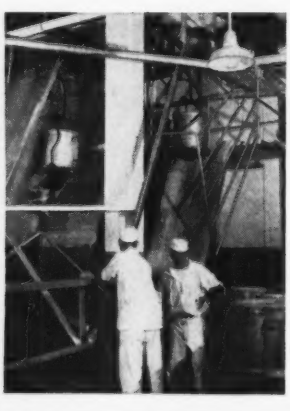
How "Zig-Zag®" Conveyor

Raises vegetables... and lowers costs!

Moving vegetables from stage to stage during processing can put a heavy load on manpower and production costs. Beechnut Packing Company has solved the problem in its plant at Canajoharie, N. Y., by the use of a "Zig-Zag" Continuous Power Conveyor. Manual handling of vegetables, from washing to straining and cooking is reduced to a minimum as "Zig-Zag" carries loaded containers between processing stages.

Lowering of production costs is one of the best safeguards against the pressure of competition, and "Zig-Zag" may be the answer to *your* problems. Why not find out? A Richards-Wilcox conveyor engineer will gladly arrange consultation without obligation. Write for complete details.





• Left, conveyor shaft built on exterior of Beechnut plant. Stock pots travel through roof of ground floor and are raised to fourth-floor level of straining and cooking department.

• Right, entry of conveyor into straining and cooking department. Note how flexing arm of conveyor pendant permits sharp-angle rise drop of stock pots.

1880 RICHARDS WILCOX IRW AURORA 1954

Reg. U. S. Pat. Off.

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS •

Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION

416 W. THIRD STREET, AURORA, ILLINOIS

This "atmosphere" is established through efforts toward the association's fundamental objectives, guided by its code of ethics. NAF's aims are "to better foremanship through education and discussion—to build management staff unity through association and weave a fraternal team-spirit through understanding and appreciation of the other fellow's job".

By dealing in attitudes, NAF stimulates spiritual zeal in management.

End (*Resume reading on page 97*)

IFT Symposium

—*Continued from page 84*

curious recent development of engineering, involving also the behavior of human beings, called "Industrial Engineering." For human beings are still employed on the production lines, and equipment must be engineered to fit human beings rather than the other way around.

The cause of so-called fatigue (or loss of strength) of shipping containers is now known to be due to gradual absorption of moisture when the ambient air in the warehouse has a relative humidity of higher than 50-55%. The higher the R. H., the more rapidly fatigue becomes apparent.

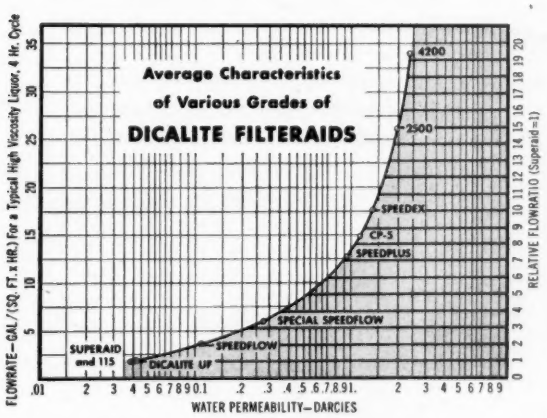
The shipping cases begin to buckle at the bottom of the pile, of course, and, where the contents do not support the load (such as products in flexible containers), the piles will ultimately topple over.

This problem, of course, requires a solution. The time of storage may be shortened. The R. H. may be maintained below 50% by suitable air conditioning techniques. The piles may be kept low enough so that the "fatigued" shipping container still has enough residual strength to support the load. Or a type of more expensive container may be employed that will have a much slower rate of absorption of moisture.

If the relative humidity is maintained below 50%, it is possible to stack the containers to a height equivalent to one-third the top-to-bottom compression test on empty new containers properly sealed.

In the engineering design of fiber shipping containers for canned goods, the problem of top-to-bottom strength is a matter of lesser moment than the end-to-end strength. The reason is that the contents will usually carry the load from top to bottom, but damage to contents can occur when the cases are subjected to endways or sideways shocks such as may occur when freight cars are "humped" in marshalling yards. There is no safe rule to follow in meeting this problem.

So "sharp" is the filtration given by this Dicalite filtercake—unwanted solids even down in the submicron range are removed up to 99% —with such high through-put and brilliant clarity, that Dicalite filteraids are used world-wide in processing beverages, oils, foods, sugars, wines, pharmaceuticals and hundreds of other products • In sugar refining, Dicalite filteraids are removing thermophilic bacteria and other impurities; they are taking out activated carbon and bleaching clays from hydrogenated oils (as well as removing every trace of the nickel catalyst); in breweries the world over, Dicalite filteraids are removing yeasts and resins, providing brilliant clarity and longer shelf life to beers and ales • These are a few of the important ways in which Dicalite filteraids are helping food processors to guard and maintain the purity and quality of their products. Chemically inert, sterilized in processing, produced from the finest crude diatomite, Dicalite filteraids provide a full range of products to meet every filtration need. The chart at the left will give you some idea of their scope.



For more complete information on filtration processes, and the uses of Dicalite filteraids, send for Dicalite Bulletin B-12.

DICALITE DIVISION, GREAT LAKES CARBON CORPORATION, 612 SO. FLOWER STREET, LOS ANGELES 17, CALIFORNIA

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

For more information, use coupon on page 187.

Shortenings engineered to order

Modern shortenings are a product of careful design from known principles, like bridges or TV sets. One producer wants a shortening that will produce a very fine crumb structure. Another wants one that will work well in packaged cake mix. Still another wants to make the best possible bread shortening out of a certain fat available to him at a favorable cost. And so the questions come at us.

Among the big differences between the primitive approach to shortening design and the modern approach are the kind and proportions of emulsifying ingredients. Emulsifiers, made themselves from wholesome natural fats and concentrated by molecular distillation,* are our specialty. Many of the principles of their effectiveness are still being worked out in our laboratories, for they are too new for the textbooks. Some of the work is necessarily on a test-tube scale, but more and more the greater part of it is in making up commercially feasible shortenings and trying them under practical conditions.

All this being true, isn't it a good idea to make sure your shortenings are up to date by keeping in touch with us? ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

*Sold under the trade-mark "Myverol."

distillers of emulsifiers made from natural fats and oils

DPi

Also...vitamins A and E

Distillation Products Industries *is a division of* **Eastman Kodak Company**

The general remedy for such end and side damage to contents of shipping cases is a very snug fitting case. In the past, the shipping cases have been too large. Recent experience shows that the case should have dimensions slightly smaller than the volume occupied by the contents.

More than half the direct labor-hours in the average food plant are packaging labor-hours. A survey revealed that in 20 plants manufacturing and packaging 22 different foods, packaging labor-hours varied from a low of 26% to a high of 90%, with the arithmetical average at 59.4% of the total direct labor-hours.

Packaging operations, though often highly mechanized, have not yet achieved the degree of mechanization or development that we find in the equipment used for producing the product to be packaged. There is a tremendous area for further improvement in packaging operations.

PROGRESS WITH INSTRUMENTS

Instrumentation in the modern food plant was discussed by a panel of experts, and William J. Scarlett, Minneapolis-Honeywell Regulator Co., was the moderator. These were among the important points made by Mr. Scarlett:

The trend toward more continuous processing demands that each step of the process be completed before the next begins. Many variables must be integrated. In effect, then, continuous processing consists of tying each step of a procedure into a continuous chain.

Instruments and automatic controls become essential in the integration of these variables.

The factors of temperature, pressure, flow, level, viscosity and other variables must be held within close limits because of the effects of each on the others.

It must be recognized that progress is continually being made, that automatic control and automation must be ultimately perfected to measure the more elusive variables. I foresee the development of control systems that will evaluate color, feel texture, and even perhaps measure bacterial purity.

There is now available a sugar supersaturation meter. It is the perfect guide to the proper seeding of the pan so that the resulting sugar is clean, pure, of uniform crystal size, and of high quality.

We have recently announced a mixture consistency recorder. This was primarily developed for bakers.

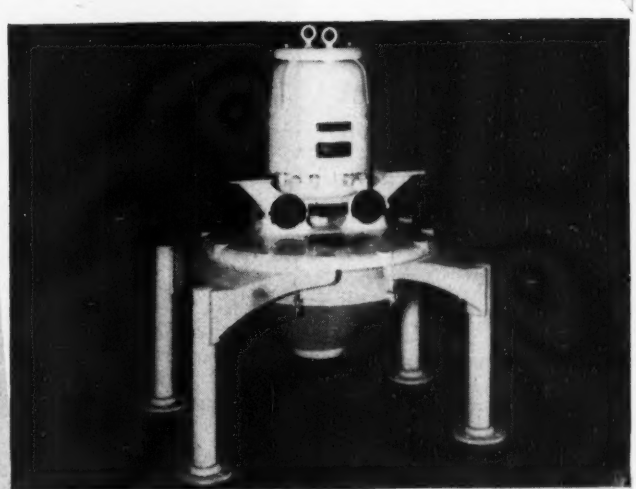
A third recent development is a continuous control refractometer. This gives a continuous measurement of re-

in the Spotlight

"ENTOLETER"

INFESTATION DESTROYER

- The "Entoleter" Infestation Destroyer is the only completely mechanical method of continuous infestation control. It provides positive insurance at low cost to both you and your customer . . . it prevents customer-rejected flour from erasing your profits!
- The "Entoleter" Infestation Destroyer will also help to maintain uniformity of your products by thoroughly blending all ingredients and eliminating "pockets" of unmixed material.
- The "Entoleter" Infestation Destroyer is unsurpassed in both the milling and food processing fields. It is compactly designed . . . easy to install . . . and inexpensive to maintain. Contact the Entoleter Division, for further information about this outstanding equipment.



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If your industry or operation is here

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MARINE	TEXTILE PRODUCTION, PROCESSING

There's a Sylphon Control to give you dependable, cost-saving regulation of temperature or pressure.... help improve your operations

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fractive index of clear fluids. It is a highly developed instrument and illustrates the axiom that any variable which can be measured can also be controlled.

Applying Measurement Principles

Application of measurement principles in instrumentation was discussed by J. G. Ziegler, Taylor Instrument Co. Mr. Ziegler stressed the fact that the food manufacturer can do much more with existing instruments than has been done to date. And he pointed the way by analyzing some problems and factors of control and outlining their solutions. Sometimes changes in the process equipment itself, or in the flow circuit, are required for proper control. And wishful thinking will not solve control problems.

Mr. Ziegler also pointed to the need for closer cooperation between the process engineer and the control engineer to achieve best results with instrumentation.

Engineering Process Control

Engineered control in the food industries was the topic of a paper by Lyle M. Richardson, The Foxboro Co. Here are some of the highlights:

No expense has been spared in engineering materials handling and processing equipment. But there is apparently too little understanding of the value of engineering process controls into materials handling and process equipment. Process control is the solution to the problem of product uniformity, quality, and production.

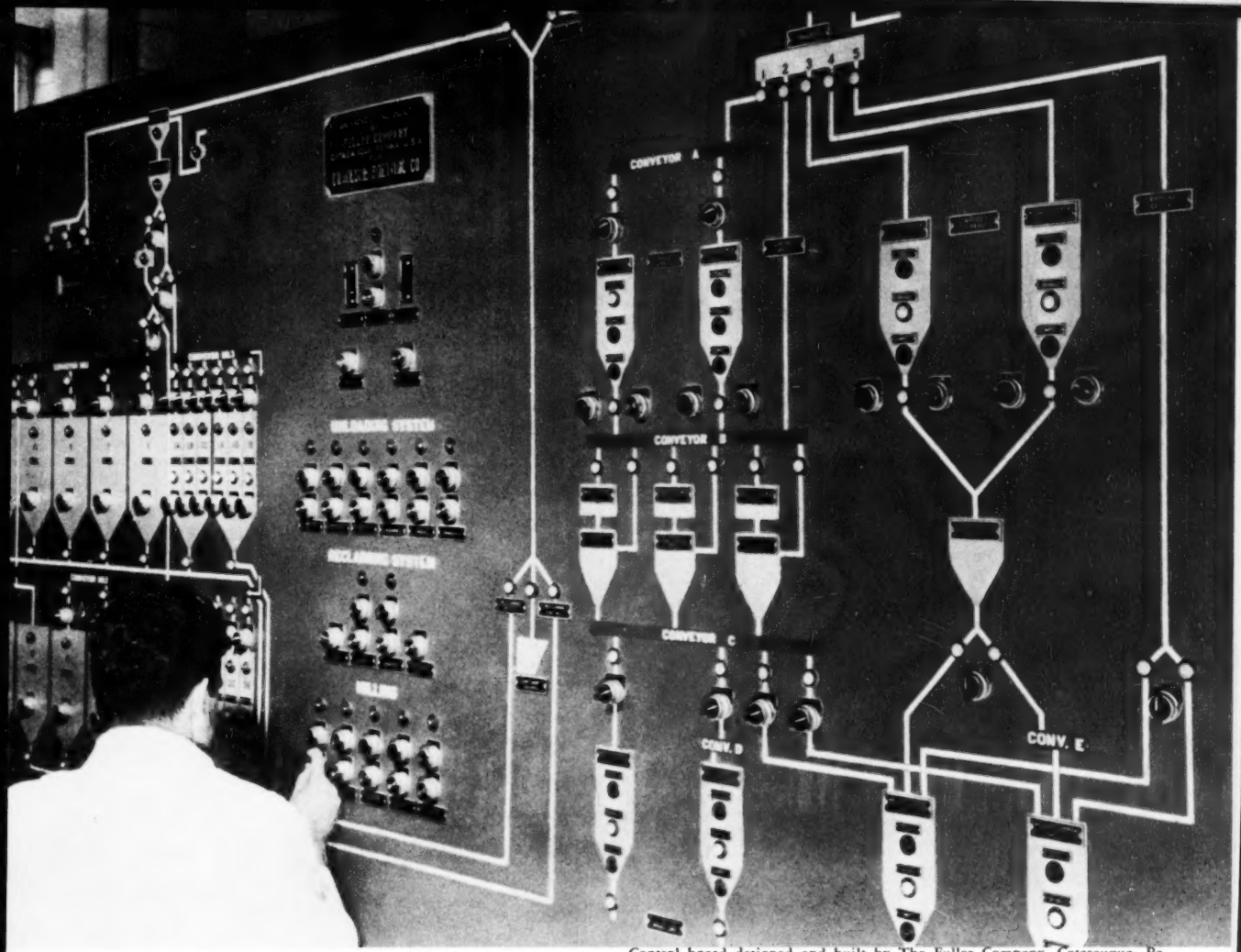
Control is no longer exclusively a tool of the laboratory. The food technologist may now consider continuous control of production as a component of his quality control program.

After describing the fundamental types of controls and their operation, Mr. Richardson observed that the responsibility for the selection of automatic control equipment can rest with one individual, providing that individual is thoroughly familiar with the process and with the instruments available.

Usually, however, the responsibility is shared by the ultimate user, the supplier of the process equipment, and the instrument manufacturer. It is the latter's responsibility to recommend the instruments best suited to the job, and this is predicated upon the user and the equipment supplier providing complete specifications.

Future of Instrumentation

The future of instrumentation in the food industry was explored by Ernest C. Clement, Mars, Inc., as the concluding paper on the food engi-



Control board designed and built by The Fuller Company, Catasauqua, Pa.

Plan electrical operation to lower your food processing costs

WESTINGHOUSE CAN HELP YOU BY . . .

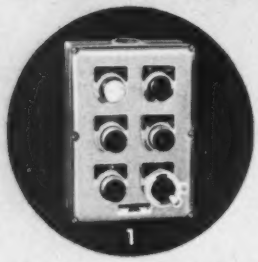
1. Engineering electric drives to boost quantity and quality

2. Improving electrical system reliability

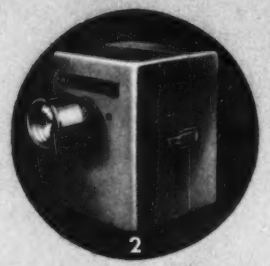
Here, one man feels the electric pulse of an entire grain handling system moving 2000 bushels of malt and other ingredients an hour. Manual handling costs are eliminated because Westinghouse electrical planning coordinates power for more efficient centralized operation. It is this ability to organize and engineer electricity that Westinghouse offers to solve your problems in lowering processing costs. When you call on Westinghouse, you call on a team of design, manufacturing and engineering specialists familiar with all the electrical apparatus needed to improve any step in your processing operation.

For example, look at this bakery . . .

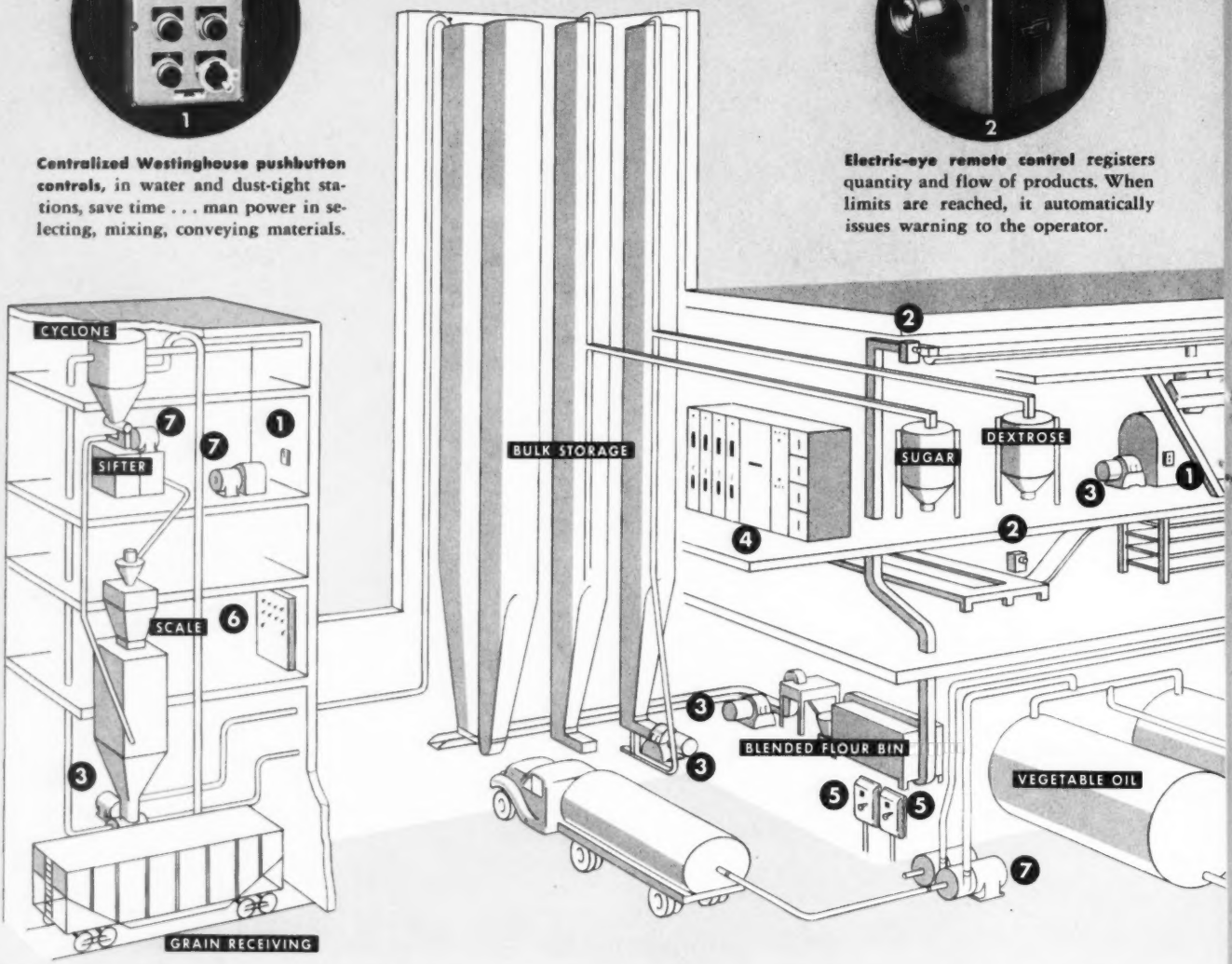
Page 1 of 4 in this section

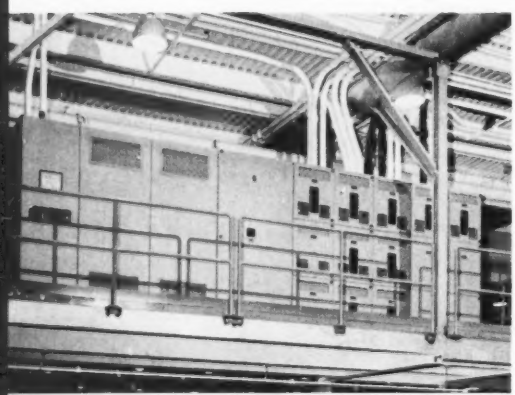


Centralized Westinghouse pushbutton controls, in water and dust-tight stations, save time . . . man power in selecting, mixing, conveying materials.



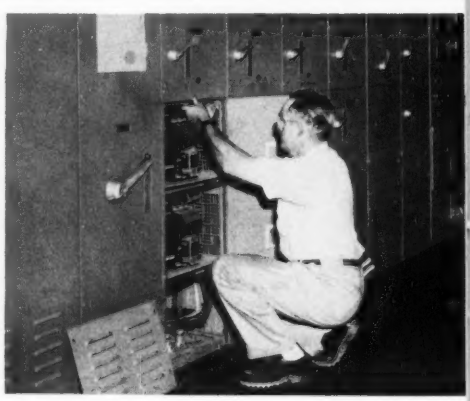
Electric-eye remote control registers quantity and flow of products. When limits are reached, it automatically issues warning to the operator.



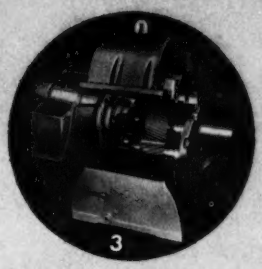


4. Westinghouse power centers improve service continuity and voltage regulation. Standardized, low-voltage circuit breakers allow for economical expansion. Dry-type construction makes the factory-assembled unit lighter and safer.

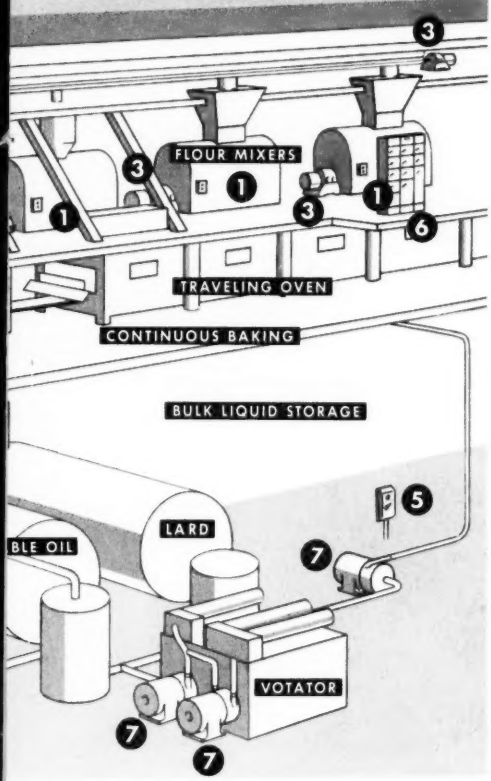
5. With AB-1 circuit breakers you minimize shutdown time three ways: First by not interrupting power on harmless overloads. Second, by allowing you to restore power with a flip of the handle. Third, by preventing over or under fusing.

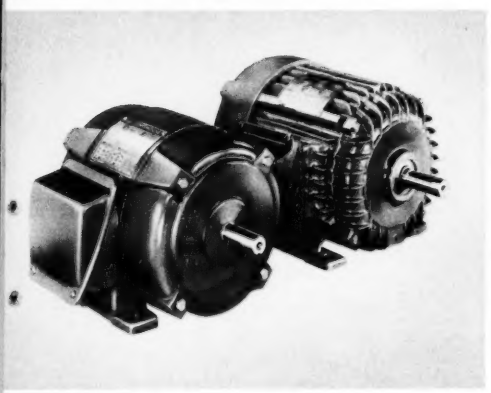


6. Control centers for process motors centralize control in protected out-of-the-way areas. They simplify interlocking of process drives by coordinating motor control in a single group easily serviced by one man.



Compact Westinghouse gear motors have horizontally split gear case to simplify inspection and care without dismantling or disconnecting the load.





7. New Life-Line "A" motor. Bondar insulation has high thermal resistance, a life expectancy of more than 3 times conventional insulations. Bondite impregnating varnish is silicone reinforced to resist vapor, oil and chemicals. New, 4-way sealed pre-lubricated bearing cuts maintenance costs.

Low cost, fluidized handling results from . . .

Electrical system reliability and . . .

A typical high production plant, this bakery operation must be assured continuous electric power from start to finished-wrapped loaf. A failure at any point means interruption of the whole cycle, loss of product, and operating costs skyrocket.

Organizing power distribution into a network system, Westinghouse engineers answer the demand for service continuity. Power is distributed at high voltage by dual feeders going to power centers (4) in load areas through the plant. Each power center transforms voltage to a secondary utilization level for the load in its area.

Serving continuity is assured by a secondary voltage tie circuit that permits the plant load to divide among the power centers. Thus should trouble occur in one part, the load is picked up by the remaining power centers without service interruption. In addition, this network arrangement enables you to extend the system in any direction, at any time, with minimum rewiring and production loss.

Drives engineered to boost quantity and quality

Centralized control and dependable Life-Line® "A" motors (7) and Westinghouse gearmotors (3) are engineered for dependable, continuous service necessary in a high production cycle. Westinghouse pushbutton stations (1), control panels and motor control centers (6) are highly flexible for location at the center of any operating area.

Intelligence from remote control and electric eye devices (3) can be fed into these operating centers to automatically indicate and operate any sequence of motors. Life-Linestarters can provide up to three interlocks for a maximum of sequencing operations. Interlocking also prevents jam ups in case of overloads or equipment failure.

The four-way seal, pre-lubricated bearing assembly of the new Life-Line "A" motor is another important answer to insuring continuous service. Sealed and pre-lubricated at the factory, these bearings eliminate the cost of greasing maintenance. Dust, dirt, and moisture are sealed out so that bearings are never contaminated; grease can never leak out; sanitation is improved.

YOU CAN BE SURE...IF IT'S

Westinghouse

Next page, add a working partner from design through installation . . .

How Westinghouse field engineering helps meet your need for low-cost operation

Application engineers speed equipment installation time, eliminate problems right from the start. They work with your staff, help match the correct electrical apparatus to the job. They not only install Westinghouse equipment, but test it to assure proper operation.

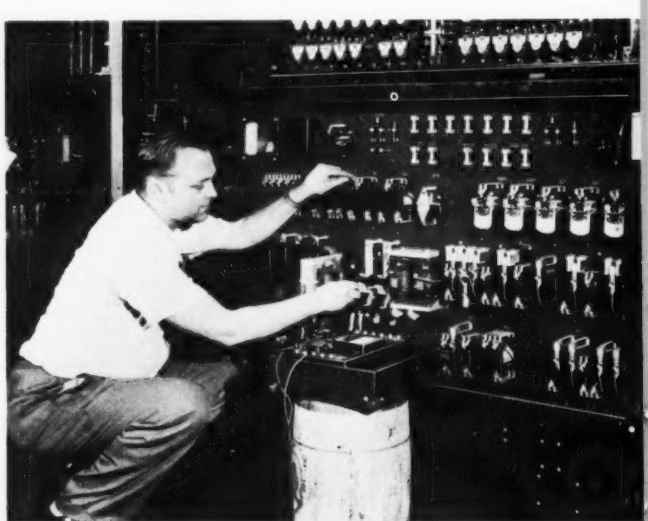
Manufacturing and Repair Plants – 38 large and well-equipped Westinghouse apparatus repair shops are available to you for maintenance jobs on all types of electrical equipment. These shops are spotted in key areas to provide factory-type repairs at a local level.

Back-up spare parts inventory—Westinghouse Renewal Parts Warehouses are located in 31 convenient cities. They're open 24 hours a day. You get genuine replacement parts fast.

For further details your Westinghouse representative will be glad to answer any questions you may have concerning information in this section and get you a copy of any of the literature listed below, or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

Bus Duct	B-5835
AB-I Circuit Breaker	B-5456
Dry-Type Transformers	B-5920
Control Centers	B-5621
Hi-Voltage, Metal-Clad Switchgear	B-5306
Low-Voltage Switchgear	B-5282
The New Life-Line "A" Motor	B-6154
Life-Line Gearmotors	B-5645
Life-Linestarter	B-4677
Complete Industrial Control	B-6051
Speed Reducers	B-5646

In planning, you get the services of 56 Westinghouse Field Engineering Offices—a nationwide network of engineering, consultation and application assistance.



In servicing equipment that cannot easily be moved, Westinghouse engineers get to your plant quickly for inspection, adjustments, or on-the-spot repairs.

YOU CAN BE SURE...IF IT'S Westinghouse

MP3005

neering program. Among his pertinent observations were these:

If you have the machines to do all the work, and you have created a transfer device to move your material from one machine to the next, what is the next step? It is to let the brain of a man control many machines through instrumentation. That is the real future of instrumentation.

It means using devices which will control the automatic machines and to feed back information so that the correction of deviations from standard will be made. In order to accomplish this end, it will frequently be advisable for you to convert from batch to continuous processing. This is not as big a change as it may appear, since continuous processing is nothing more than infinitesimally small batches.

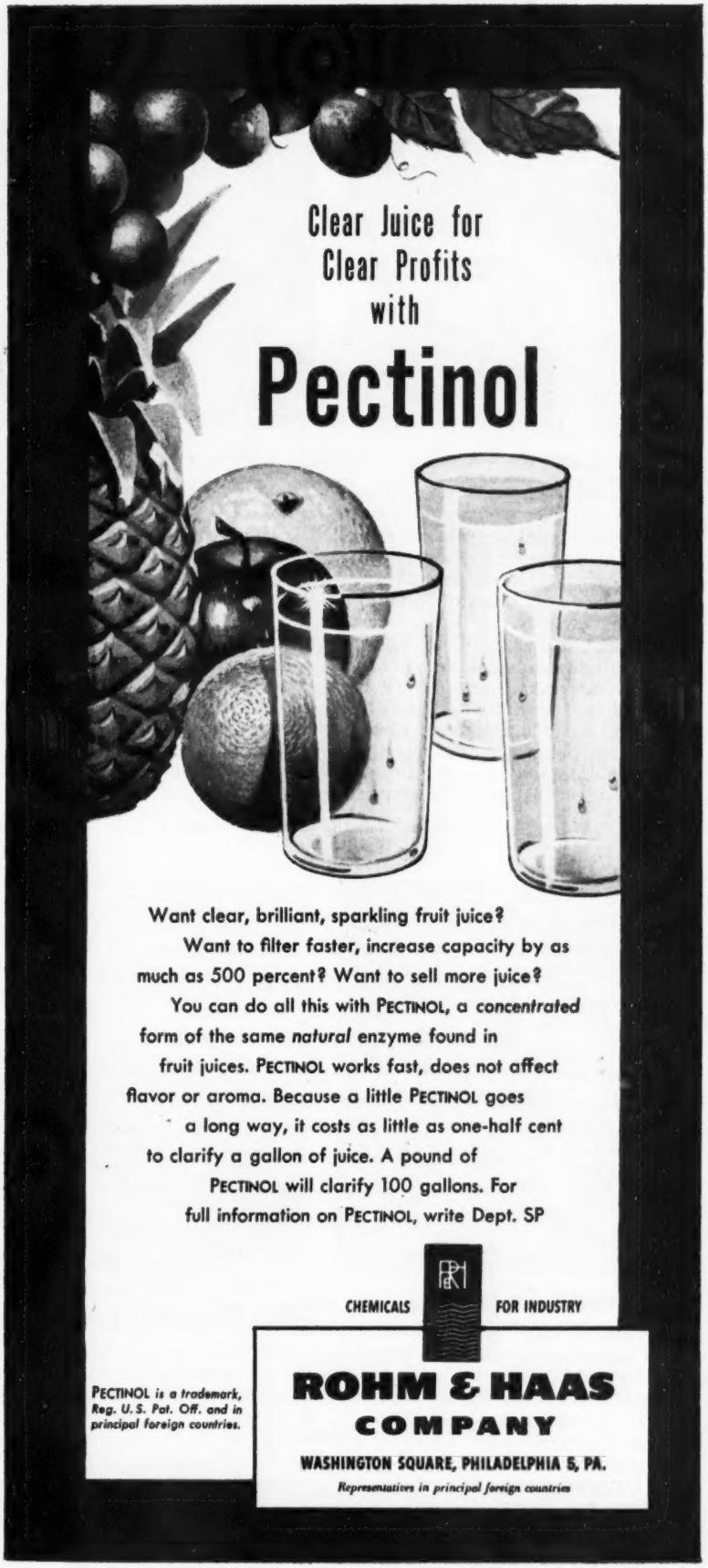
The line of demarcation between batch processing and continuous processing is not as definite as it would appear on the surface. As a matter of fact, if a cannery were sending cans through a unit one at a time, the process would be done in batch units the size of a can. But it would be called a "continuous process." Basically, the reason for converting to what we call continuous processing is to reduce the size of the batch to a small efficient magnitude so that the problems of feed-back, anticipation, and time lag will disappear.

If a factory is using batch processing at present, and an attempt is made to install controls at separate points in the process in the hope of obtaining a degree of automation, the result will be disastrous. As sure as anything, sooner or later, the controls will fail to properly mesh with one another and one portion of the process will get out of phase with the balance of the process. Any engineer who ever tries to approach automation thus will wish he'd "stood in bed".

Instead, a manager that approaches the problem of automatic control in an effort to increase productivity per manhour will be wise to consider the overall picture and to engineer overall for automatic control and instrumentation and to lay out a program that will have all the necessary safeguards that assure success. If the management in the name of economy decides to do the job in small sections, it will find itself backed into a corner by the inevitable contradictions.

What I am doing now is making a plea for the true engineering approach to the problem of instrumentation. An overall picture must be thought through if the problem of installation of controls is to be carried out systematically and successfully.

End (Resume reading on page 85)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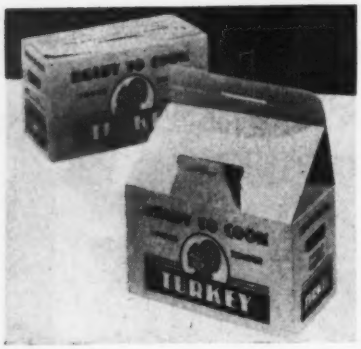
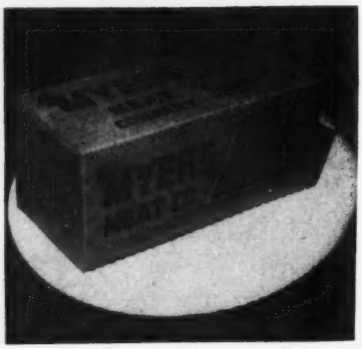
WASHINGTON SQUARE, PHILADELPHIA 5, PA.
Representatives in principal foreign countries

For more information, use coupon on page 187.

NEW PACKAGES & PRODUCTS





New Cartons for Bulk Poultry, Meat

Directed at making it easier for the consumer to carry home heavy meat and poultry quantities, two new carton styles have recently appeared.

Manufactured by Hinde and Dauch, Sandusky, O., is a poultry carton that has the advantages of being easy to assemble, inexpensive, and easy to stack. It is produced in five sizes to accommodate birds from 7 to 31-lbs. The shipper is stitched at the factory and delivered in flat form. Double-thickness end and bottom control insure added protection and strength, while a combination of the corrugate board with glue prevents deterioration.

A ten-in. container designed for take-home use will hold 5-lbs. of individual hamburger patties, ready for cooking or freezer storage. Made by Robert Gair Co., Inc.'s Ohio Corrugated Box Division, the carton is being used by Myers Meat Co., Cleveland.

Each carton holds from 20 to 40 patties, depending on the thickness the customer requires. The carton may be used for frozen or fresh meat. Patties are faced on both sides with waxed paper, eliminating need for inside waxing of the container.

For Package Data Use Reader Service Card

Cover-All Dairy Lids

Sturdier and more eye-catching packages are the results attained with the use of Continental Can Co.'s new metal cover-all lids for paper containers. Product protection and preservation is assured with the positive seal given by the new closure.

Designed specifically for dairy processors, the closure features double-seal construction, providing a second positive seal at the lid groove. Since the lid is warp-free, it may be used at greater filling and capping speeds, with lower production losses. They can be lithographed in color.

The lids are available for 8-, 12-, and 16-oz. containers.

"The Can's the Pan"

B & W Foods, Inc., Mexico, N. Y., has introduced its Grandma Brown's Home Baked Beans in a novel container. Labeled in an attractive red and white plaid, the can was designed by Edward Gustave Jacobson and is manufactured by Continental Can Co., New York. In keeping with the slogan, "the can's the pan," the processor recommends that the product be heated and served in the container. Instructions on the cover of the can advise the consumer to remove the lid, and place the beans in a pre-heated 450 degree oven until the beans are brown. The product itself is prepared according to a tasty "old-fashioned" recipe.

Coffee Extender Marketed

Long a staple of thrifty Dutch housewives, Buisman's flavoring is now being distributed nationally by Fino Food Processing Co., Burbank, Calif. Chief attraction of the flavoring in these times of rising coffee prices is the boast that one tablespoon of the flavoring added to one pound of coffee will result in the beverage equivalent of two pounds.

Likened to monosodium glutamate and its uses among foods, the flavoring develops and brings out coffee flavor, as well as extending it. Containing no chicory or caffeine, it is packed in two sizes: a 4-oz. jar for consumers, and a 1-lb. instutional can.

Processed in Holland, the product is imported and packaged by Fino Food Processing Co. Distributed on the West Coast since 1951, the "coffee extender" has recently made an appearance in the New York area.

In preparation, the consumer is told to add a tablespoon of the flavoring to a pound of fresh coffee. After mixing them thoroughly, the coffee is ready to use, with only one tablespoon of the mixture being needed for every two cups of beverage desired, halving the usual requirements. An added feature of this reduction is that caffeine consumption is cut by 50%.

Ingredients include caramellized starch and calcium phosphate. The product is soon to be marketed in portion control pouches.

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AN EXPLANATION

In answer to increased interest in a recently inaugurated procedure for conducting "on-the-spot" demonstrations of air-flotation equipment, we are pleased to make the following explanation.

The advent of our lab-size Whippet V-80 Separator makes it possible to establish, in your own plant and at your convenience, accurate forecasts of results which will be obtained from the identical process under full-scale operating conditions.

Such a demonstration may be of invaluable aid to that phase of your research program which involves the economy of operations and the quality of raw or end products. Perhaps the V-80 will indicate an immediate usefulness. Seeing is believing.

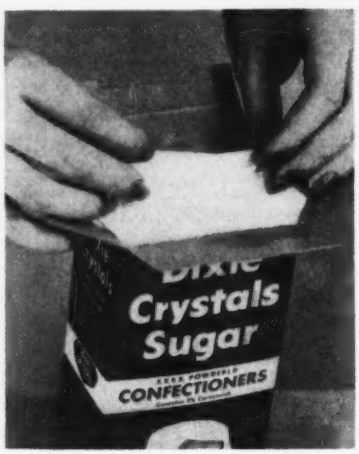
Your move is simple. Write to the department and address below. Tell us that you want to see the results of separations made by effecting differences in specific gravity through air-flotation . . . under *your* actual operating conditions, rather than in a catalog. We'll take it from there.

Dept. F-854

SUTTON, STEELE & STEELE, INC.
1031 SOUTH HASKELL, DALLAS, TEXAS

Canned Juice Blend

"HI-C" Party Punch is currently being marketed by Clinton Foods, Inc. A blend of raspberry, pineapple, grapefruit, orange, and grape juices, the beverage is non-carbonated. Produced as a companion item for HI-C Orange and grape drinks, the product is packed in 1-qt. cans. Red in color, the beverage has a tart, refreshing flavor. It is served chilled.



Reclosable Sugar Carton

Long a complaint of the housewife, the problem of an effective reclosable carton for sugar has been reportedly solved by a new carton developed by Robert Gair Co., Inc., New York.

Savannah Sugar Refining Co., Savannah, Ga., not satisfied with the closure features of their Dixie Crystals Sugar, had requested Gair to design a carton that would not only solve the reclosure problem, but aid brand identification.

The result is an easily opened and easily reclosed carton featuring a broad product identification band. Top flaps of the carton are glued in eight spots from which the glue repellent ink has been omitted. The glue is strong enough to keep the carton sealed during transportation, but offers no difficulty in opening.

The consumer opens the carton, removes sugar portion from the waxed inner liner, closes the top and inserts the rounded flap in a slot. The top of the carton stays flat after reclosing, allowing easy storage, and providing maximum protection.

The type of sugar is printed on a white ribbon across the face of the package, making it easier for the housewife to select the appropriate sugar.

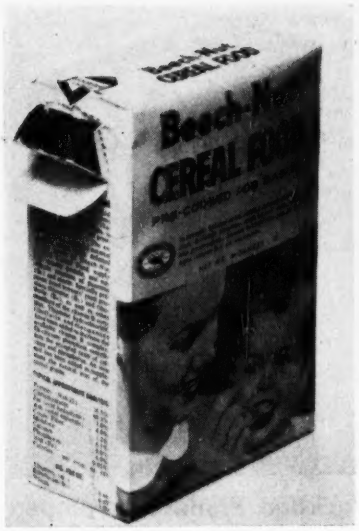
New Cookie Wrap

Reported as the first instance of heat seal packaging of round cookies, Dad's Oatmeal cookies, are being marketed by Dad's Cookie Co., Ltd., Vancouver, Canada. Using packaging equipment designed by Fred Todt Co., Los Angeles, the processor is insured more efficient packaging through the new method, and falls in with the current trend toward sub-unit packs.

The package contains three dozen cookies, packaged in six individual heat-sealed cellophane packages insuring product freshness.

Canned Beer ½-Qts.

Beer in a half-quart can is being processed by Joseph Schlitz Brewing Co., Milwaukee. The 16-oz. container is being manufactured by Continental Can Co., New York, and is similar in label design to the company's 12-oz. can.



Pouring Spout for Cartons

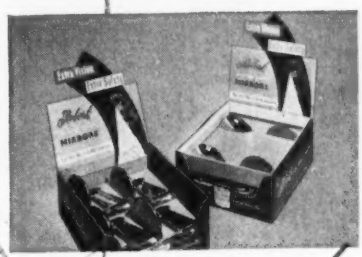
Ease in the dispensing and ready-sealing of packages is featured with the metal pouring spouts recently adopted by two processors. Beach-Nut Packing Co. has adopted a spout for its popular 4-oz. baby cereal package. The housewife breaks the seal, pulls out the spout, pours out the desired amount of cereal, and pushes the spout back, insuring a dust and dirt-free seal.

Also sporting a corner spout is Western Condensing Co.'s "Peebles Instant Milk", which features the spout overwrapped with cellophane over the slogan "always pours."

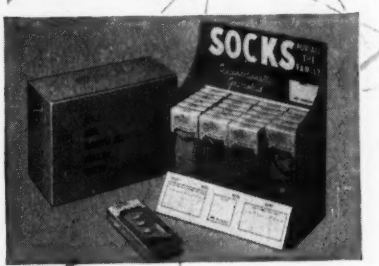
Truck-Shaped Package

Saddle Rock Products, Inc., New York, is packing cookies in a red, black, brown, and white carton shaped like a forest ranger's truck. Designed by Robert Gair Co., Inc., New York, the carton was designed in cooperation

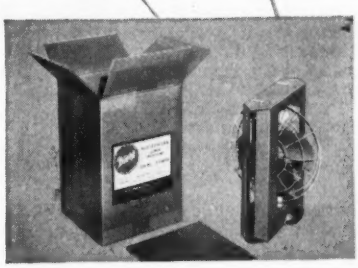
save packing
TIME



utilize
SPACE



eliminate damaging
MOTION



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Write for booklet, "How to Ship More Economically in Corrugated Boxes." Hinde & Dauch, Sandusky 11, Ohio.

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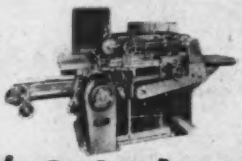

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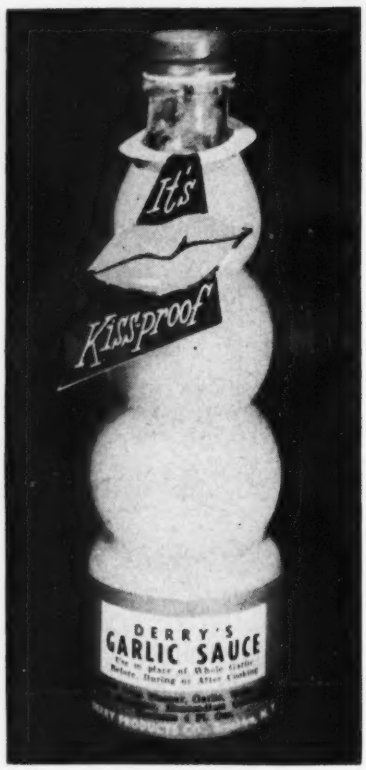
with the USDA forest conservation program, and features the familiar Smokey, the bear. The sides show Smokey and his five nephews riding a truck full of fire fighting equipment. The carton has two top flaps instead of the usual one, one forming the curved radiator front, the other the windshield.

Designated as "animal" cookies, the cookies are made in the forms of Smokey and his nephews.

For Package Data Use Reader Service Card



Odorless Garlic Sauce

Prominently displaying the slogan "It's kissproof!", a jar of odorless garlic sauce has debuted under the Derry Products Co. label. Packed in a tall, 4-oz. jar, the garlic sauce is the seventh in a line of sauce products that includes soy, barbecue, seafood cocktail, steak, gravy, and spareribs sauces. An odorless onion sauce is also to appear soon.

The problem of the lingering aftertaste and odor of garlic has been solved by a process perfected by Derry Products Co. after years of experimentation. The new process is reported to detract nothing from the garlic flavor. The sauce is particularly recommended for soups, salads, meats, fish, and garlic bread.

Ingredients contained in the sauce consist of vinegar, garlic, water, sugar, salt, stabilizer, and MSG.

Package, Product Revamped

Improvement of both product and package has been accomplished by General Foods revamping of Post's Grape-Nuts Flakes. A new process is producing a sweeter, crisper cereal, said not to turn mushy in milk.

Both the 8-oz. and 12-oz. packages are to be made wider and taller, with the front panel carrying the improvement information above a picture of Roy Rogers.

Tinned Tonic

The first instance of a product of its kind being marketed in cans, Cantrell and Cochrane's "Old India Quinine Water" is being distributed nationally. The can is labeled in white and two shades of green.

Cottage Cheese in Mugs

Colorful Siesta Ware mugs are being used by Arden Farms Company to package their cottage cheese line. The sixteen-ounce mugs are amber, bound with brass bands. Ornamental handles are made of carved hardwood. The mugs are manufactured by Owens-Illinois Glass Company of San Francisco.

Bamboo and palm trees point up the trade name. The 12-oz. crown-top can is reported to be a solution to the detrimental effect light has on quinine water.

New Product Shorts

Flavor Added to Dessert Line
Apple-flavored "Jello" is being market-tested in Dayton, O., by General Foods Corp.

Kid's Kitchen Kit
A cooking set for children manufactured by American Metal Specialties Corp., Hatboro, Pa., features a Campbell Kids cookbook and cans of Campbell soups.

Canned Rice
Precooked under pressure in cans is feature of Durand's quick rice, processed by Pine Grove Canning Co., St. Martinsville, La.

Bananas for Baby
Gerber's Baby Foods has added strained bananas to its line. The 4¼-oz. jar contains fully ripe bananas, sugar, lemon juice, and tapioca.

Addition to Meat Line
Strained pork has been added to H. J. Heinz Co.'s line of strained meats.

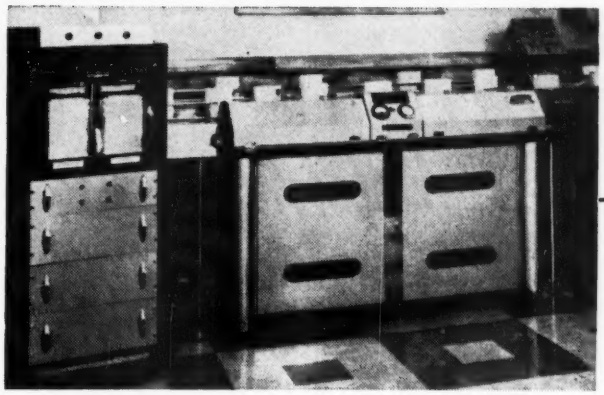
Companion to Canned Meat
Promotion has begun of Hormel's chopped beef, twin to the company's popular "Spam". The product is packed in a 12-oz. tin.

All-Purpose Shortening
"Fluffo", a golden-colored, all-purpose shortening is being processed by Proctor & Gamble Co. A white "Fluffo" is also being tested.

Crusted Crustaceans
Prepared and frozen by Gene Boone, Portland, Maine, lobster pie is being prepared for national distribution.

More Canned Pop
"Tru-Ade", a non-carbonated orange drink, is being introduced in the Washington and Baltimore markets in a 12-oz. flat-top can.

Soup Line Expanded
Campbell Soup Co. has added snapper and cream of potato to its line of frozen canned soups.



SELECTROL Weighs, Classifies, Sorts, and Records Weights of Your Entire Production Output

SELECTROL sorts your high-speed production into three classifications: over-weight, under-weight, and correct weight. Immediate savings are effected—correct weights require no further handling. Over-weights and under-weights are diverted for correction. Simultaneously, the RANGE AND AVERAGE RECORDER charts each unit as it flows over the SELECTROL. It tabulates the average weight in groups of consecutive packages, and the range of weights within the same groups. This statistical information provides a sound basis for accurate adjustment of filling or processing operation. In addition, a running count is made of all packages in each weight classification. Send coupon today for complete details.

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Fluid coupling, oil-immersed clutch, constant mesh transmission — a combination that transmits power smoothly and efficiently with minimum wear and service. There is NO CLUTCH PEDAL — just ONE push-pull forward and reverse lever!

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1113 Spring Street, N.W., ATLANTA

Meat Fat

—*Continued from page 133*

brings out flavors not detectable when the fat is tasted alone.

This led to use of a new type fat-flavor test. The fat is emulsified into skim milk to make a 10% fat mixture —which is then scored against a control.

To secure a uniform basis of comparison it was found that a good grade of U.S.P. mineral oil was preferable for the control because this type of oil is extremely bland and quite uniform. The fat to be evaluated is emulsified into skim milk in the same manner as the control. A small hand homogenizer can be used for this emulsification after the mixture has been warmed to approximately 140 deg. F.

Scoring System

A trained taste panel of from 10 to 13 members is given samples of emulsified product and asked to score them on the basis of the following 10-point system:

Flavor	Score
Excellent	10, 9
Good	8, 7
Fair	6, 5
Poor	4, 3
Very Poor	2, 1

Average of the individual scores is used as the flavor score of the product.

This flavor test was used to select those fats that met our rigid flavor requirement from the variety available. By this method there were found two fats that had the desirable blandness in both initial flavor test and in the finished product. These were a blend of hydrogenated cottonseed and soya oil, and a high quality neutral-flavored oleo fat.

Question was, would these fats make a good mellorine?

The answer was obtained by using them at various percentages and checking the resultant product for flavor, body, texture, over-run or emulsification properties, melt-down, and shrinkage.

Gives Desired Over-Run

Results indicated that both fats when processed into mellorine and tested gave flavors comparable to that of ice cream. Also, it was interesting to note that in freezing an oleo-fat

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JENKINS Fig. 504 Bronze Globe with **TEFLON** disc and packing

Jenkins Fig. 504 was designed for the critical requirements of controlling oxygen, nitrous oxide, or any non-flammable gases in hospital services. Industry was quick to note its unique advantages, and it is now frequently specified for systems carrying gaseous fluids for heating, cooling, lighting, and processing, where pressure does not exceed 400 psi, or temperature a maximum of 150° F.

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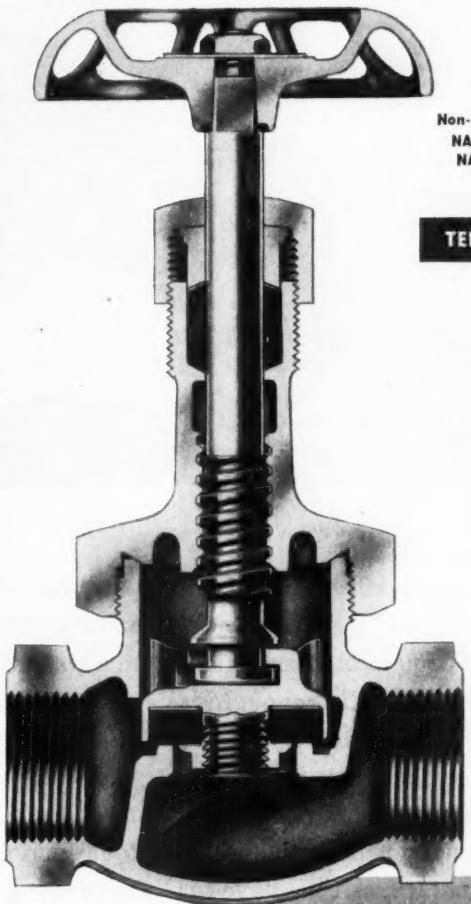
Get details — find out how Fig. 504 can improve efficiency and economy in your hookups for critical service. It's another example of the broad range of "valves for every service" in Jenkins' complete line.



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All bronze parts are thoroughly degreased before assembly.

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Alloy bronze spindle is polished to permit easy turning and assure leak-proof seal.

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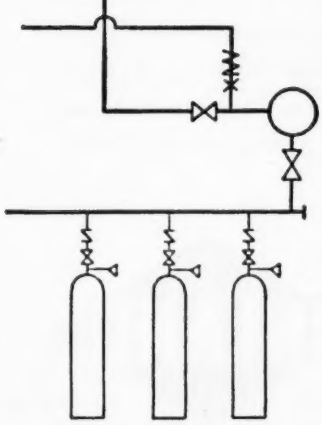

GET COMPLETE INFORMATION from your Jenkins Valve Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17. Ask for Bulletin 116.

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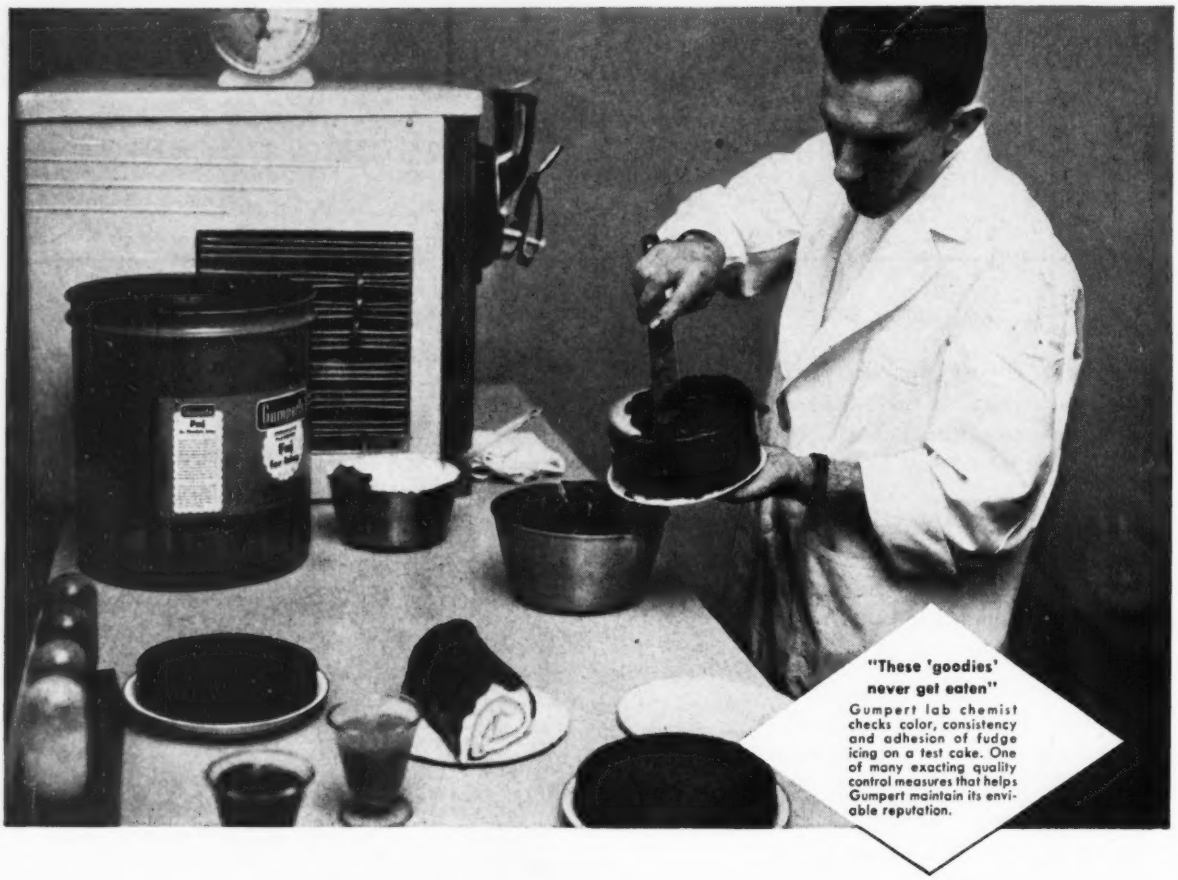

"These 'goodies' never get eaten"

Gumpert lab chemist checks color, consistency and adhesion of fudge icing on a test cake. One of many exacting quality control measures that helps Gumpert maintain its enviable reputation.

In the food industry, quality control from shipping dock to customer is equally important as quality control during production.

That's why S. Gumpert Company, Inc., Jersey City, New Jersey, leading producer of high quality food products for bakers, ice cream manufacturers, restaurants and other institutions, continues to specify Inland steel containers, as they have for the past ten years, for their most sensitive products. They know they can count on Inland "protection-eered" containers to maintain the "appetite appeal" of the products they ship.

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Food Division, Dept. A

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product, desired over-run was readily obtained as well as a dry body.

It was borne out in several experiments that the oleo-fat mellorine was resistant to churning-out of the fat during freezing—which has been a problem in processing the vegetable fat mixes.

The following experiment is typical of the stability of oleo fats in mellorine. Soft-served frozen desserts (6% fat) were produced using various vegetable and oleo fats. All the mixes were processed the same, using the same formula, and homogenized under identical conditions. Within a half hour the vegetable-fat mixes showed churning, freckling, or graining-out of the fat, whereas in the oleo-fat mix churning was less discernible, even though the mix was left in the freezing unit under constant agitation as much as 16 hr. It may be noted that coating of fat over the surfaces of the freezing unit also is a good indication of churning.

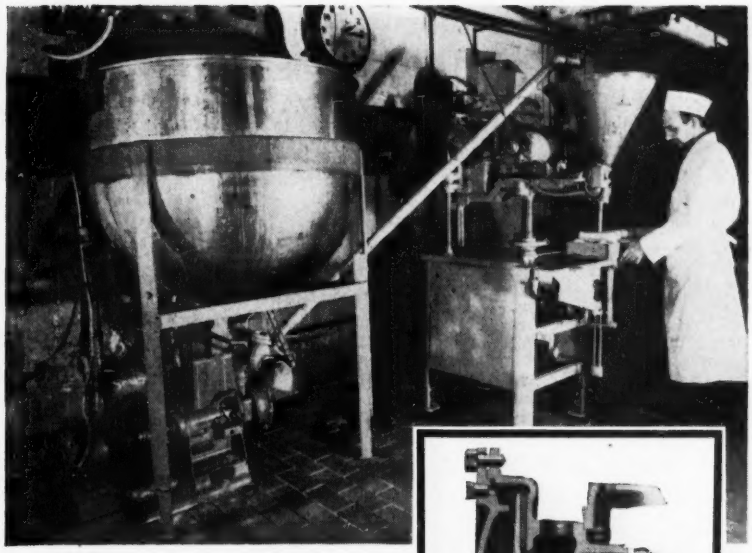
Practically all of the above results were obtained from fats which had been made in pilot plant runs. Consequently, it was necessary to establish the processing procedures for making commercial-size runs—batches of from 30,000 to 60,000 lb. A special process was developed on a production basis to achieve this result.

The vegetable fats that are to be processed into mellorine fats are hydrogenated to the melting point desired (90-97 deg. F.) prior to blending and deodorization. Deodorization is a process of steam distillation, under high vacuum and temperature, in which the volatile flavors are removed. Extreme care is required in deorodization in order to obtain the desired bland, neutral flavor needed. A nice smooth body is obtained by plasticizing, which chills down the melted fats rapidly. And the product can be packaged readily.

In making the oleo-fat product it was found necessary to use top-grade selected fats. These are prepared by the special process developed in the Armour Research Division. The high melting point fat fraction is removed after chilling in order to obtain the aforesaid desired melting point (90-97 deg. F.). Deodorization and the addition of effective antioxidants produces the desired flavor and stabilizes it so that it will remain uniform during periods of storage.

Both of these fats—the vegetable and the oleo fat—are produced commercially and now are being promoted within the states that permit making of mellorines. Both products are made under the label "Fro-Star" and are designated PV (for pure vegetable) and MF (for meat fat).

End (Resume reading on page 146)



The corn meal mush kettle and package filler in the North Side Packing Company plant, Pittsburgh, Pa., are shown above. At right is a cross-section of the Goulds Fig. 3715 pump. It's available now not only in Nos. 304, 316, and Gould-A-Loy 20 stainless steel, but also in all iron, all bronze, bronze-fitted, and iron or bronze with stainless trim.

How plant saves 23½ manhours packaging 500 lbs. of mush

Corn meal mush posed a big problem for the North Side Packing Company in Pittsburgh, Pa.

A 6-man crew had to spend 2 hours packaging a 250-lb. batch. Job analysis showed that transferring the mush from the kettle to the filling machine took most of that time.

Seeking a solution to this cost-of-packaging problem, the company bought a new 500-lb. kettle and installed a 1″ Goulds stainless steel centrifugal pump under it to pump the cooked mush to the filler.

Now one man operates the filling machine, and two girls bring empty wrappers to him, and carry away the filled packages. This team averages a 500-lb. batch in 7 minutes. That's a time-saving of 98.5%.

The Goulds Fig. 3715 stainless steel pump is made especially for handling corrosive and erosive materials. That accounts for its popularity in the food and chemical industries. The stuffing box is on the suction side of the impeller, which puts it under suction pressure only. Since its stainless steel construction resists corrosion, it protects the product against contamination. For detailed information ask for Bulletin 725.4. Write to Goulds Pumps, Inc., Seneca Falls, New York.

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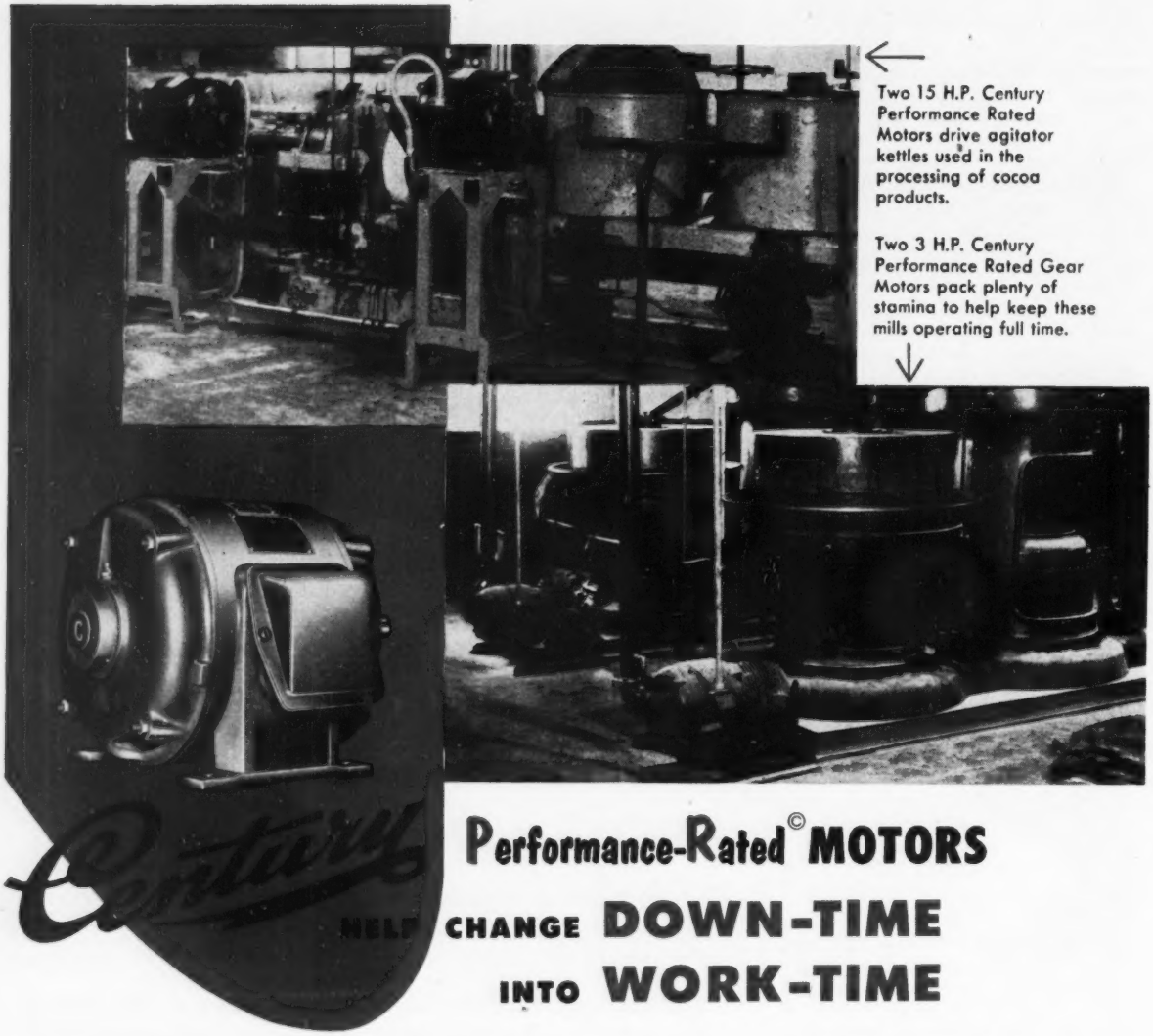

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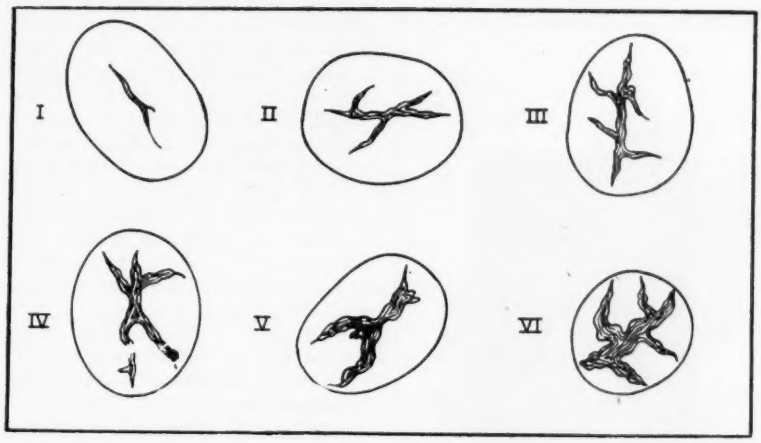

Stage of Lima Bean Maturity Quickly Determined By Microscopic Examination of Starch Grains

A new, quick, accurate method of determining maturity of lima beans by microscopic examination of starch grains has been developed and tested on two strains, using 6 maturity dates.

After harvesting, pods were shelled, beans washed and slurried in 95% alcohol with a Waring Blendor. Starch grains were then examined under a microscope.

Hylum of the grain becomes larger and more ramified as maturity advances (see drawing above). Pattern of observations was identical in both strains of beans.

A simplified method suggested for use by fieldmen comprises taking random samples from various parts of a field, grinding the beans in a mortar with water and examining a drop of diluted slurry under a microscope.

When the hylum of most of the starch grains begins to thicken along with its ramifications (stages III and IV above) the field is ready to harvest without loss of yield or reduction in quality.

Digest from "A Simple Method to Determine Maturity and Quality in Lima Beans," by D. K. Salunkhe and L. H. Pollard, *Farm & Home Science* (Pub. by Utah Agr. Expt. Sta., Logan, Utah), 42, June, 1954.

Froth Flotation Cleans Whole Kernel Corn

First used by the mining industry for concentrating ores, froth flotation is now removing debris from green peas, corn, lima beans, blackeyed peas, soy beans and sprouts, blueberries, cranberries, pecans, and walnuts.

It eliminates about ¾ of the labor in removing foreign matter, saves large tonnages that would otherwise be discarded, and improves product quality.

First application was separation of nightshade berries from shelled peas—230 million lb. were cleaned by this method last year. Workers at Prosser, (Wash. laboratory) devised a method of treating peas with an emulsion of air, oil, water, and sodium lauryl sulfate. Tiny air bubbles, dispersed through the emulsion by a circulating pump, provide a froth that floats out contaminating substances.

Greatest labor saving potential is in cleaning blanched or raw whole-kernel corn for removal of kernels injured by corn borers and earworms. A modified flotation process promises excellent results by carrying insects away in the froth along with bits of husk, silk and injured kernels.

Digest from "Froth Flotation Saves Time and Produce," *Agricultural Research*, (Pub. by USDA) 10-11, April, 1954.

Speeds Banana Ripening

Green bananas treated with 2,4-D ripen 3-8 days earlier than in the presence of ethylene. They are more uniform in color and sweeter to the taste. In addition, the new method enables produce dealers to ripen fruit according to market demand.

The 2,4-D may be applied as an aerosol spray using ester form mixed with Freon, or as a spray or dip of 250-500 ppm. in water.

Special precautions needed to obtain best results are: (1) Ventilation to remove natural gases which inhibit 2,4-D's action; (2) proper humidification to replace moisture lost by ventilation, and (3) means of preventing drift when using the aerosol.

Digest from "This May be Another Job for 2,4-D: Banana Ripening," *Agricultural Research* (Pub. by USDA), 10-11, April, 1954.

BAKING

Role of Flour Fractions In Staling of Bread

New and extensive studies have been made of the staling of bread. By first fractionating the flour into gluten, starch, tailings, and solubles, and then making bread of gluten and starch, with or without the other fractions, it was possible to observe directly the effect of each on the staling process. More than 500 1-lb. loaves were baked by the sponge-dough method from synthetic flours representing various combinations of the fractions.

Samples of these breads 1-6 days old were submitted to a sensory test panel, members of which had been specially trained in judging bread freshness and had shown superior ability. Based on feel of crumb,

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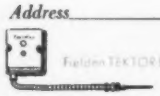

Fielden TEKTOR Electronic Level Control

Fielden TEKTOLOG Electronic Recorder

odor and flavor, and mouth feel, they rated the samples on a 6-point scale ranging from very fresh to very stale.

The panel found it easy to recognize and rate very fresh bread, but other stages of freshness were not so easily determined, particularly the intermediate conditions of slightly fresh and slightly stale. However, the scores of replicate samples agreed well, and there was a decrease in the scores (from 6-1) as the bread aged.

One set of tests was designed to show the effect of tailings fraction of the flour, and of crumb moisture on sensory tests of bread staling. Tailings had little direct effect when moisture of different breads was the same. But with its high moisture-sorbing capacity, addition of tailings fraction permits making breads of higher moisture content.

Such bread is regarded as fresher than similar bread of lower moisture content after equal storage periods. Crumb moisture influenced panel opinion, a difference of 2% markedly affecting judgment of freshness. Migration of moisture from crumb to crust of bread during storage can account for much of the staling that occurs from 20-140 hr. after baking.

Effect of gluten and starch on staling was studied in three breads of different composition. Organoleptic and laboratory tests were made, but as is frequently observed in such cases there was no direct relationship between panel judgment and laboratory tests. Conclusion was reached that staling is caused by two separate processes.

During first 2 or 3 days of storage, staling is caused by changes in starch, whereas loss of moisture from gluten is responsible after longer storage periods.

Supplementing preceding tests another series was made on effect of flour fractions and various starches on firming of bread crumb. Increasing protein content of synthetic flours but maintaining a constant ratio of gluten to water-solubles decreased average crumb firmness and crumb firming rate.

Substituting soft-flour starch or gluten for hard-flour starch or gluten increased average crumb firmness but did not affect firming rate. Starch tailings had no effect on crumb firming rate but this fraction decreased average crumb firmness.

Hard- and soft-flour water-solubles, especially those of rye flour, decreased both average crumb firmness and crumb firming rate. Rates of crumb firming for bread containing cassava, rye, and oat starch did not differ from that of bread made from the control.

Oat starch, but not rye or cassava

starches, decreased average crumb firmness. Average crumb firmness and firming rate of breads containing corn, rice, and especially waxy corn and waxy sorghum starch were greater than bread from the control flour.

Digest from "Staling Studies of Bread Made with Flour Fractions. I. Fractionation of Flour and Preparation of Bread; II. Selection of the Sensory Test Panel; III. Effect of Crumb Moisture and of Tailings Starch; IV. Effect of Gluten and Wheat Starch," by W. G. Bechtel and D. F. Meisner, and "Studies on Bread Staling. V. Effect of Flour Fractions and Various Starches on the Firming of Bread Crumb," by Neville Prentice, L. S. Cuendet, and W. F. Geddes, *Cereal Chemistry*, 163-206, May, 1954.

CANNING

Better Canned Soups

A method for making canned soups from split dry seeds such as peas, beans and lintels, that is claimed to give improved flavor and cut processing time is the object of a recent patent.

In the process, a predetermined weight of seeds (either dry or following soaking in water) is placed in a can to which is added water, fats, seasonings and, when desired, vegetables. Ratio of seeds to water varies from 1-7 to 1-4 depending on moisture content of seeds.

Cans are seamed and heated to 230-260 F. to sterilize contents—holding time depends on can size, 25-35 min. for 1 lb. capacity. Following sterilizing, cans are agitated to convert liquid-solid mixture to a soup by breaking up the softened, cooked seeds.

Cooking and sterilizing are done simultaneously in approximately the same amount of time required to sterilize soups that have been cooked prior to canning. This is said to eliminate the cooked flavor characteristic of conventional canned purees.

Digest from U. S. Patent 2,662,823, issued Dec. 15, 1953, on an application dated July 26, 1950, to H. F. Snow, assigned to The F. H. Snow Canning Co., Inc., Pine Point, Me.

Sterilizing Containers For Acid Foods

Acid food products packed by hot-fill, hold and cool procedures may be subject to spoilage as a result of container contamination or leakage. This may be caused by too low temperature of the container surfaces during the holding period, resulting in growth of spoilage organisms.

Extensive laboratory investigation of the matter and a survey of commercial procedures have shown that a minimum heat treatment of can surfaces after closure equivalent to F_{250} of at least 20 is essential.

In order to insure this lethality the following recommendations are made:

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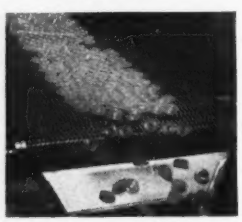
COOLING CANDY
Air circulates freely through open mesh of belt to cool these candies quickly. Moving belt speeds production, carries constant stream of candies to subsequent stations.



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nectars in 12 oz. cans, a holding period of 3 min. between sealing and water cooling, provided the following conditions are met during filling and holding:

1. Temperature of product at filler is at least 200 F.
2. Preferably no can washing immediately after closure; if such washing occurs temperature of wash water should be at least 160 F.
3. Cans are rolled, rocked, or inverted during part of holding period so that contents are agitated and excess water drained off.
4. Cans are not placed on wet solid metal plates or wet rubber belts, and are not exposed to strong, cool air currents.

For viscous products like tomato paste and fruit concentrates, the following alternatives are recommended:

1. Fill at 195 F. or above. After closing, wash with water above 160 F. and pass cans through water or steam cooker maintained at 180 deg. or higher for at least two minutes. Water cool.
2. Fill at 200 F. After closing, wash with water at 160 F. and roll cans to get rid of excess water. Hold cans 5 min., if in an enclosed space or 8-min. if not enclosed, but in either event free from air currents, water vapor and wet surfaces, and no water entrapped under the cans. Water cool.
3. Fill at 195 F. or above. After closing, wash with water above 160 F. Roll cans to get rid of excess water. Invert on wooden pallets or trays, place an empty pallet or tray on top of upper layer of cans and air cool.

Digest from "Container Sterilization for Acid Products by Hot-Fill, Hold-Cool Procedures," by C. P. Collier and C. T. Townsend, paper presented at the Canning Problems Conference, National Canners Assn., Atlantic City, N. J., Jan. 25, 1954.

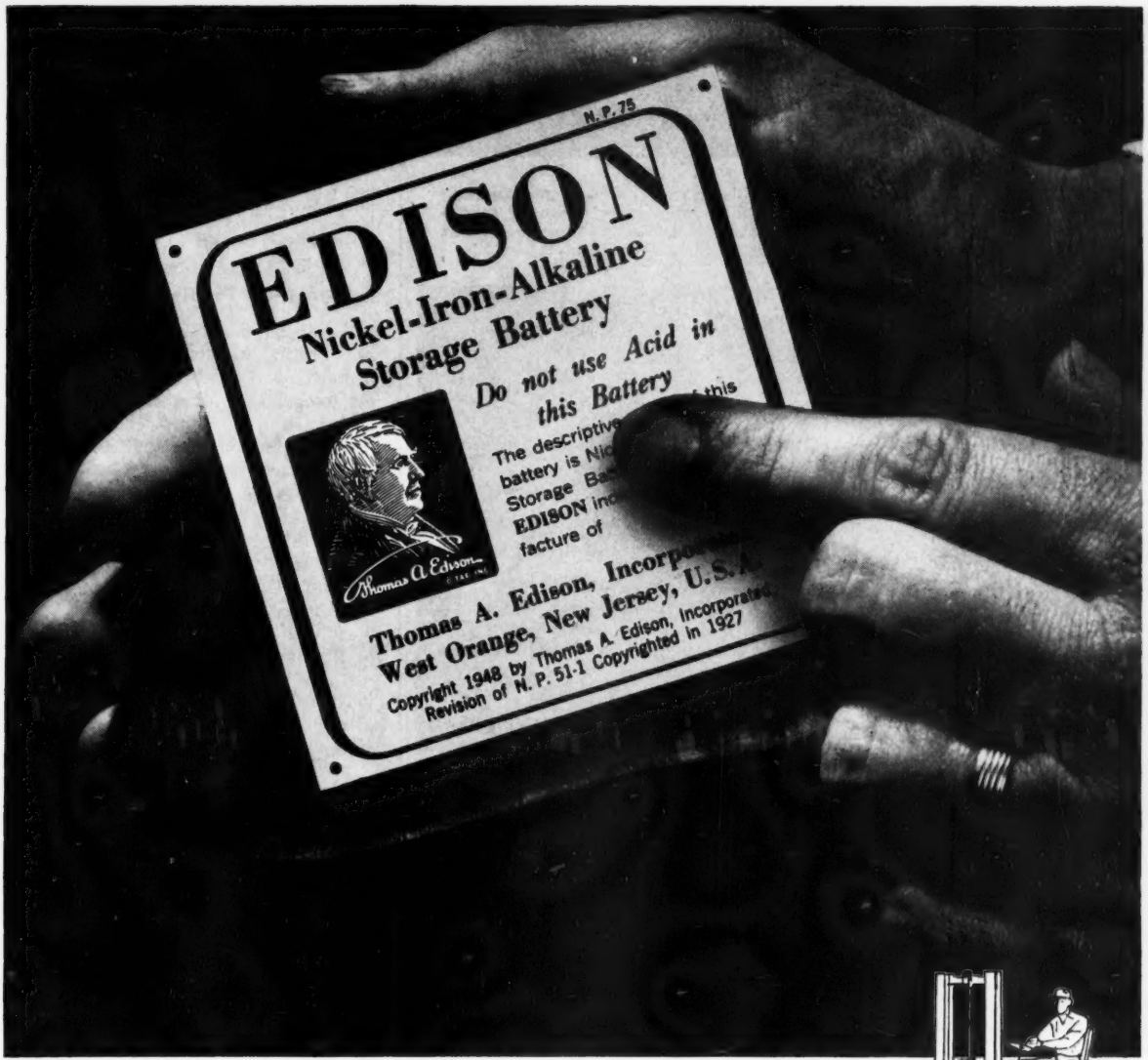
DAIRY

New Time Saving Test For Substitute Fats

A method that readily detects foreign fats in ice cream at the 10% level by direct chromatographic determination of molar concentration of butyric acid in the fat is presented.

It eliminates fat extraction, simplifies chromatographic separation, and gives reproducible results. However, amount of fat substituted is estimated only semi-quantitatively.

In its operation, 6 ml. melted ice cream is saponified with KOH and ethanol. Portion is then ground with H_2SO_4 and dry silicic acid and mixed with washed chloroform. Higher fatty



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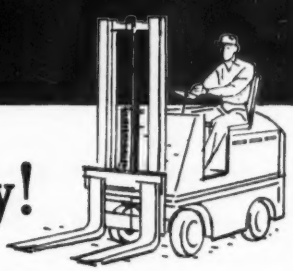

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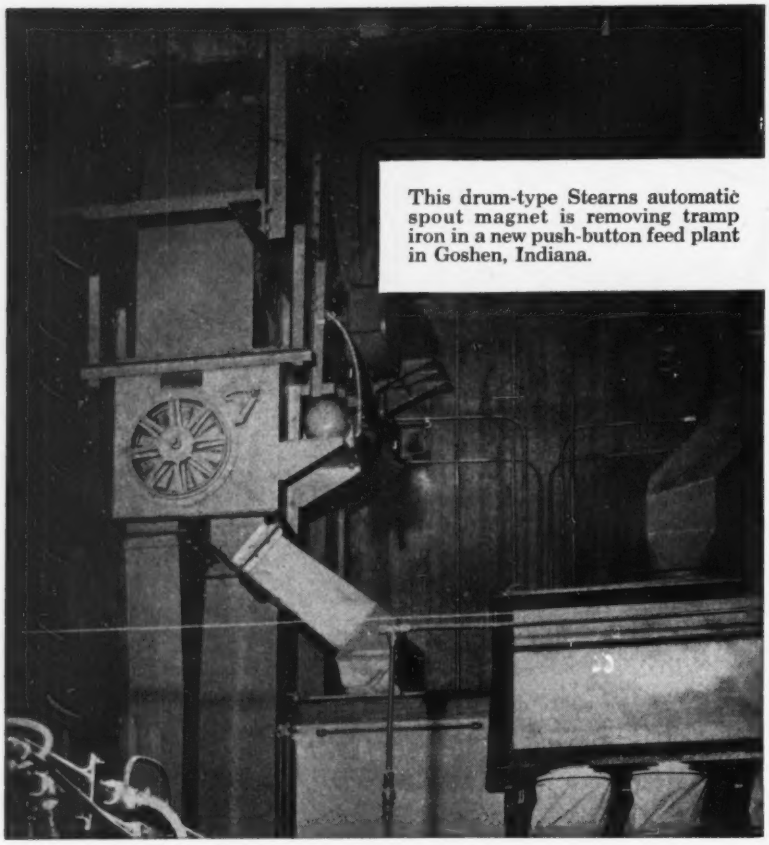

This drum-type Stearns automatic spout magnet is removing tramp iron in a new push-button feed plant in Goshen, Indiana.

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Install a Stearns drum-type magnetic spout separator and forget about tramp iron hazards. This efficient Stearns unit removes destructive bolts, nails, tacks, etc. from your product — *continuously, automatically!*

here's how it protects your product

Material in process can be fed into the separator at any angle, over a stainless steel cylinder surrounding a stationary electro or permanent magnet. As this material passes through the magnetic field, the contaminating tramp iron is held to the face of the cylinder and carried to a point beyond the magnet's pulling force and dropped into a discharge chute! The purified product falls by natural trajectory into a separate chute and continues through its production process.

No levers — no cleaning — no time-wasting interruptions. Deep, powerful magnetic field of a Stearns separator insures positive protection — even with large amounts of fast-flowing material.

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A post card request for Stearns Bulletin 93-E is a positive step to plant safety and product purification.

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acids are removed and butyric acid-containing solvent is titrated with absolute alcohol. Butyric acid is calculated by special formula.

One analysis requires 1-1½-hr., but 4 can be run simultaneously in 2-hr.

Digest from "Measurement of Butyric Acid in Fat With Reference to the Determination of Substitute Fats in Dairy Products," by W. J. Harper and T. V. Armstrong, *Journal of Dairy Science*, 481-87, May 1954.

Frozen Milk Problems

As storage facilities below O F. are not readily available in distribution channels, and +10 is about the highest temperature allowable, a method for preparing frozen milk that will give maximum stability between these temperatures is desirable.

Least stable milk was obtained by rapid freezing at low tetmperature with liquid nitrogen. Storage life at +10 F. was increased by holding partly frozen samples at 26.6 F. for as much as 48 hr. before storage.

At O F. storage life is not affected by freezing rate. Slow freezing by any method increased storage life at +10 F. Tests were made for "volume of protein precipitate" in tube centrifuged in standard manner.

Digest from "Estimation of Protein Denaturation in Frozen Milk," by D. Rose, *Canadian Journal of Technology*, 78-84, and "Effect of Freezing Rate on Stability of Frozen Milk," by D. Rose and H. Tessier. IBID, 85-90, May. 1954.

MEATS

Aureomycin Aids Meat Curing

Of the numerous antibiotics now known, only chloramphenical, aureomycin, and terranycin have been found bacteriostatic to organisms on fresh meat. And aureomycin is the most effective.

On hot beef rounds 55 ppm, aureomycin in physiological saline solution was infused by way of external iliac artery using a Griffiths pump. Bacteria were inhibited and rounds remained sound even when held at room temperature for 48 hr. before chilling. Untreated controls became sour or showed evidence of possible spoilage.

Whole beef carcasses were infused with aureomycin as soon as possible after bleeding while vascular system was intact. After dressing one half of each was placed in a cooler, the other was held at room temperature (68-77 F.) for 48 hr. before refrigerating.

Sides did not differ in appearance 120 hr. post mortem, but those held at room temperature were more tender (Deatherage & Rieman method). Im-

provement was equal to 2-3 weeks hanging, thus demonstrating effect of delayed chilling. Bacterial counts at 120 hr. were essentially the same, and the aureomycin had practically disappeared.

In bulk fresh pork sausage, 2 ppm. aureomycin delayed spoilage and kept bacterial counts at much lower levels than in plain or spiced controls.

Digest from "The Use of Antibiotics in Meat Processing," by H. H. Weiser, L. E. Kunkle and F. E. Deatherage, *Applied Microbiology*, 88-94, Mar. 1954.

SANITATION

Detergent Properties of Salts Of Alpha-Sulphonated Acids

A study has been made of the detergency, solubility, and surface-active properties of the mono- and disodium salts of α-sulphonated lauric, myristic, palmitic, and stearic acids and esters.

Extensive experimentation showed that the less soluble salts were the better detergents. In a test with distilled water, disodium α-sulphostearate, sodium α-sulphomyristic acid, and sodium α-sulphoplamitic acid were about equal in detergency and the best of 8 tried.

Disodium α-sulpholaurate, the most soluble salt, in all cases had the least detergency. Six esters showed little difference in detergency, and were equal to disodium α-sulphopalmitate in distilled water, but inferior in hard water. Ammonium α-sulphopalmitic acid and triethanolammonium α-sulphopalmitic acid are more soluble surface-active agents and detergents than the sodium salts.

Esters of primary alcohols containing 1-6 carbon atoms are readily soluble in water and quite stable to hydrolysis, especially in acid solution. Salts of α-sulphonated esters of secondary alcohols are stable to both acid and alkaline hydrolysis.

Digest from "Surface-Active Properties of Salts of Alpha-Sulphonated Acids and Esters," by A. J. Stirton, J. K. Weil, and R. G. Bistline, Jr., *Journal of the American Oil Chemists' Society*, Vol. 31, 13-16, Jan. 1954.

BEVERAGES

Sources of Chill Haze

Chill-haze formation in beer that is cooled to near melting-ice temperatures is a problem of long standing in the brewing industry.

Swedish workers have shown that solids separated from beer by cold centrifugation are a copper-tannin-protein complex, which can be traced to beta globulin, a protein peculiar to barley. But it now seems possible that

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In almost every type of business there are jobs that require coding and/or counting — labels, coupons, time tickets, money or checks.

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IN many firms the Tickometer is used to rubber-stamp . . . imprint, number, date, code or cancel—as it counts. Makers of food and drug products, for example, code-mark their labels and packages with it, to prevent imitations, to identify and date origins, machines,' inspectors, factory lots or batches, grades, special orders—quickly, cheaply.

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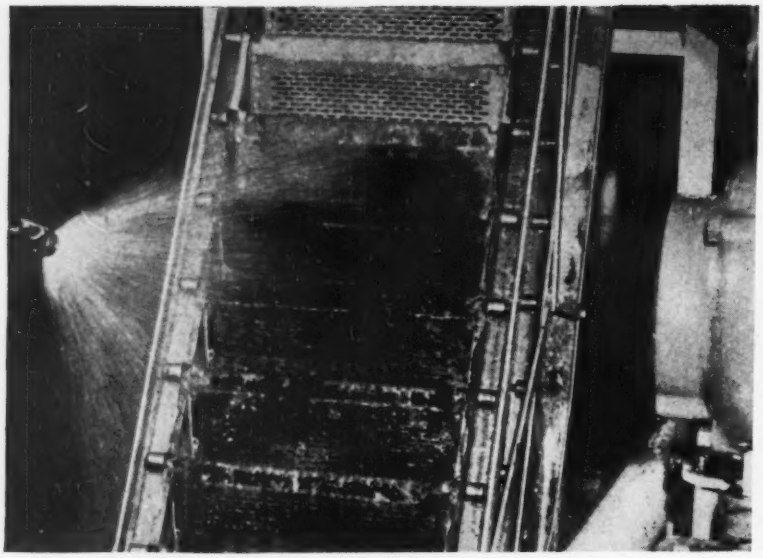

Here's the key to faster spray-sanitation

Now you can zip right through sanitation chores easily by putting to work one of the deadliest and fastest bacteria-killing combinations known. Oakite Bactericide is the bug-killer and the Hozon Unit is the key to quick application.

Here's the simple Oakite system for wiping out contamination. In an ordinary bucket, water-mix pre-determined ppm solution of Oakite Bactericide. Hook up your Hozon Unit between water outlet and hose. Place the Unit's small siphoning tube in solution. Turn on the water and start spraying.

Water pressure sucks the Bactericide solution through the hose and discharges it at the nozzle at the exact ppm you want. You sanitize just as you water your lawn, reaching all areas no matter how inaccessible.

Because of its low pH, Bactericide goes to work immediately beginning its killing action within 5 seconds after application. Harmful bacteria are knocked out quickly preventing costly spoilage. Bactericide and Hozon—a combination you can't beat.

And here's news. The Hozon Unit is given FREE to purchasors of either Oakite Bactericide or Oakite Sanitizer No. 1. Write today and get complete details on how you can have faster, more effective plant sanitation. FREE booklet on request. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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***Food Engineering* Reports**
LATEST TECHNICAL NEWS
In Keeping Up With Field. . . . page 189

other substances can form hazes in beer on chilling.

A yellow-brown solid has been separated from Belgian low fermented pale beer that contains iron, copper and protein (68.8%), but in which exhaustive tests revealed no tannins, though tannin reactions were obtained in the beer from which it came. Thirteen amino acids were found in it on hydrolysis, but no cysteine or cystine; hence, oxidation of sulfhydryl groups was not involved.

Paper chromatography indicated that the chill-haze material contained the pentoses, ribose, xylose, and arabinose, all of which were present in the unchilled beers, while in the beer with chill-haze removed by centrifugation, there was no ribose, and diminished amounts of xylose and arabinose. Chill haze in the beer studied seems therefore, to be due to interaction of beer polypeptides and beer pentoses by a Maillard type of reaction.

Digest from "Researches on the Composition of Beer Chill Haze," by W. Lhoest, R. Lontie and J. De Clerck, *Bulletin de l' Association des Anciens Etudiants en Brasserie de l' Universite de Louvain*, Vol. 49, No. 3, 121-50, 1953. (In French.)

ENGINEERING

Drum-Type Citrus Juicer

Citrus juice and rind oil are extracted simultaneously in a manner to permit their separate recovery, in a recently patented machine.

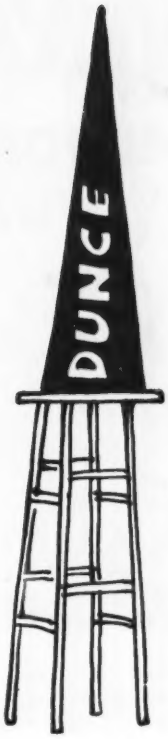
Apparatus comprises a pair of coacting rotors mounted on parallel axes, one above and offset from the other. Their peripheries are equipped with a series of hemispherical cups so spaced that when the drums rotate, successive pairs of matching cups are brought together.

Cups are formed of thin plates separated by narrow spaces, and when they come together the plates of one cup fit into the spaces of the other, permitting a crushing or squeezing action. Whole citrus fruit is fed to the upper or head rotor, one to a cup, and crushed when the matching cups come together.

Lower cup is connected with a passage that carries extracted juice to the center of the rotor and thence to a suitable receptacle.

Digest from U. S. Patent 2,659,298, issued Nov. 17, 1953, on an application dated Sept. 29, 1949, to K. H. Hudson, Tampa, Fla., assigned to Food Machinery & Chemical Corp., San Jose, Calif.

When Nature Hasn't Played Fair with a Grape



You sometimes have to give Nature a boost, for the sake of your own pocketbook. That's when Norda can be a big help.

Here's how it works:

You use Norda genuine natural fruit Flavors, because they give your products real true-fruit taste. They're rich and wonderful.

Maybe, though, it's not profitable to use *all* natural fruit flavors. Then "piece them out" and supplement them with Norda imitation Flavors. They have the same fine characteristics. They're full-bodied, true to type, almost indistinguishable from the genuine. You can economize with them, without skimping on strength or quality.

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Optional features MAKE IT WIDELY ADAPTABLE

From a tough liquid handling problem to pumping just plain water, the new Deming Fig. 4011 series end suction centrifugal pump is "matched to the job" with the proper liquid end and proper power end.

Many years of experience in centrifugal pump design have been incorporated in this pump to make it an outstanding addition to the Deming line of centrifugal pumps. Some of the many features are:—

Semi-open, non-clogging type impellers of extra heavy, three-vane construction; available with wiping vanes for handling special liquids.

Deep packed stuffing box with grease or water lubrication is furnished as standard construction. For special applications, various other types of stuffing box construction can be furnished including mechanical seals.

New four-piece separate liquid end assembly permits special construction in corrosion-resistant metals with the power end of standard material. Other optional features for abrasive or other special services can be supplied.

Sizes range from one through five-inch discharge with capacities up to 1000 gallons per minute and maximum heads up to 250 feet. Units are available with electric motor (as illustrated), gasoline or diesel engine driven, with pulley for belt drive or pump only.

Write for new Bulletin No. 4011 which contains complete details, illustration of construction and performance data on Fig. 4011 Deming End Suction Centrifugal Pumps.

THE DEMING COMPANY
556 Broadway • Salem, Ohio

Specify **DEMING PUMPS**

Nuts Shelled Electrically

According to a recently patented invention, nuts are cracked by shattering shell with instantaneous high-voltage electrical impulse discharge with a current value of the order of hundreds of amperes.

Nuts are fed to apparatus one at a time and pass between electrodes in such a position that electrical discharge passes through longest diameter.

High internal gas pressure created by electrical discharge takes place so rapidly that shell is blown outward and practically fragmented. Kernel sustains only slight, if any, damage. Energy released and rate at which it is released can be controlled accurately within wide limits.

Digest from U. S. Patent 2,661,784, issued Dec. 8, 1953, on application dated July 21, 1950, to Fred C. McMillan, Corvallis, Ore.

—End—

Continuous Enrichment

—Continued from page 131

in Table II, Col. 6. The supply of peanut oil in the reservoir was not replenished during the experiment.

Data on measurements of delivery of salt at a shaft speed of 8 rpm. are shown in Table II, Col. 4. No variation in the delivery of salt at this speed could be observed, and the supply of salt contained in the hopper was not replenished during the operations.

Uniformly Incorporated

Samples of peanut butter made with this equipment were analyzed for content of vitamin A. Results of analyses, reported elsewhere**, indicated that the vitamin A was incorporated uniformly and that 78.5 plus or minus 4.5 U.S.P. units of vitamin A per gram of peanut butter were contained in the product.

Measurements with the above described equipment of the rates of delivery of roasted peanuts, salt, hydrogenated peanut oil, and peanut oil as a carrier for vitamin A indicated a high degree in uniformity of delivery. No significant changes in rate of delivery were found upon reduction of the "head" of material contained in the hoppers.

** Willich, R. K., Morris, N. J., O'Connor, R. T., and Freeman, A. F. "Peanut Butter —VIII. Effects of Processing and Storage On Vitamin A Incorporated in Peanut Butter." In Manuscript.

The above article was initially prepared by the authors as "Peanut Butter—VII. Equipment for Fortification of Peanut Butter With Vitamin A."

End *(Resume reading on page 133)*

Frozen Fruits

—*Continued from page 127*

pletely covered all the fruit, had retarded any noticeable degree of oxidation. Sucrose pack was oxidized to a depth of 1-1½ in.

These samples were made into commercial batches of preserves. Oxidized portion of the sucrose pack was first removed, pureed, and remixed with the fruit in order not to introduce any adverse variables. Capped fruit was used just as it was. Preserves were submitted to the taste panel for evaluation (Table IV). In all points–color, flavor, and texture–capped sample was given superior rating over the sucrose pack.

Red sour pitted cherries were packed in the same manner as the other fruits with 27+ 3 Frodex, and a control with 4+1 sucrose. Fruit was frozen, stored for several weeks, then thawed. Upon examination, sucrose pack fruit was oxidized and dull in color to a depth of about 1 in. Capped sample was bright in color, having a brilliant sheen and no noticeable oxidation.

This pack was not large enough to make a full-scale batch of preserves. However, preliminary tests in the laboratory indicate the same trend in results as were found in tests made of the other fruits.

End (Resume reading on page 129)

Mechanized Ramps

—*Continued from page 91*

the plant-handling equipment used, and also the means of powering it. When powered platform-type or fork trucks are employed, the slope may be steeper than for manually-operated trucks.

Floating Action Helps

When light highway equipment is loaded, or the plant truck is extra heavy (loaded weight exceeds 50% of rear axle capacity of motor truck) a floating action in the ramp is desirable to give smooth operation and compensate for sag and rebound of the truck bed. Floating action permits the ramp to raise and lower with the truck bed as a load passes over, and insures alignment at all times during loading or unloading.

With large-capacity fork trucks, sag and rebound are intensified. When loaded, most of the combined weight is on the front wheels of the fork truck, and as the load passes from dock to truck bed, spring and tire de-

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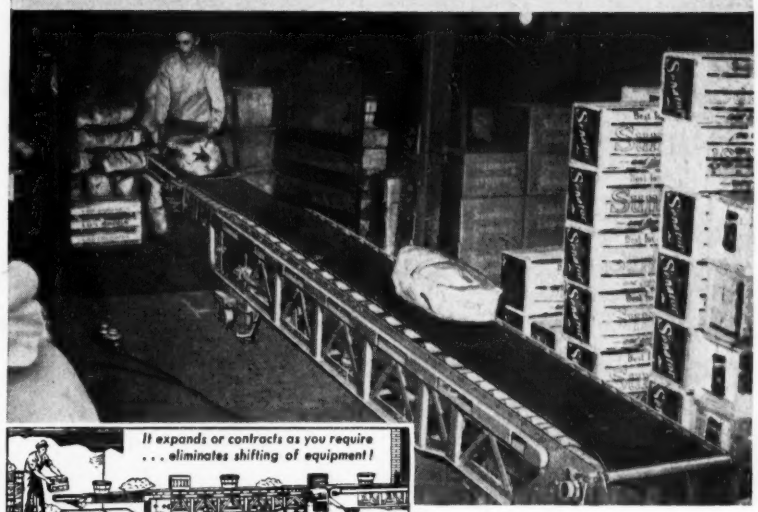

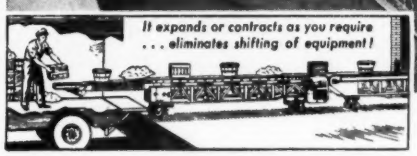

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flection can create as much as 5 in. sag.

This, plus the rebounds, creates a condition that makes the light, loose bridge plate impractical. There is a tendency to throw the plate, starting the truck rolling and causing such a bump that the running gear of the fork truck may be damaged, possibly seriously injuring personnel. Under these conditions, a floating-action ramp is vital.

Design Features

The powered adjustable ramp has layover arms that rest on the truck, with provisions for releasing the lift mechanism so that it can float or move freely up and down with the sag and rebound of the truck.

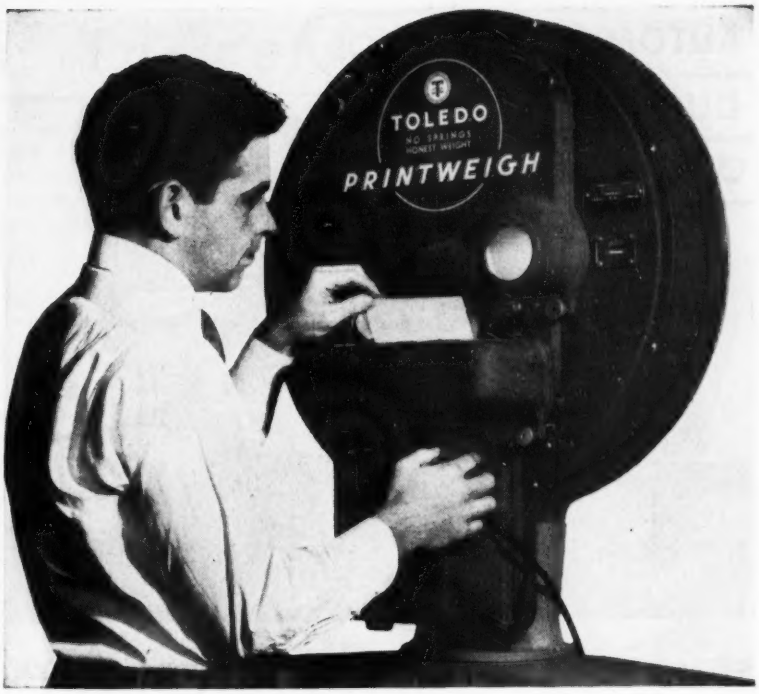
A full load adjustable-type unit can be supplied where the nature of the cargo does not permit the use of layover arms. But such a unit is not as fast, since occasional adjustments are necessary.

When planning installation of adjustable ramps, the first point to consider is the range desired above or below the existing dock. With this information, selection of the proper length ramp for most efficient operation is simplified.

Next, is the handling equipment itself. The lower the power of the unit, the more gentle must be the slope of the ramp. Grade clearance and wheelbase of handling equipment to be used also are important factors.

In general, powered adjustable ramps are to be gaged by the following 11 features:

1. Weatherproof construction (if located outside).
2. Ability to support rolling loads off-center for cross travel. In addition, a high safety factor is of great importance.
3. Ability to operate efficiently at low temperatures.
4. Design for easy relocation when required by plant changes.
5. Enclosed lubricated wearing surfaces for protection against dirt.
6. Flexibility of driving-power.
7. Layover arms or a lip heavy enough for the service required and reaching out at least 12 in. The arms should have ample bearing on truck bed to minimize pressure, and should be rounded on the bottom to prevent scuffing.
8. Incorporation of heavy bridge plates, of not less than 12 in. effective length, crowned and beveled, and in two sections to compensate for trucks out of level in the horizontal plane.
9. Anti-fall engineering, so ramp won't drop if vehicle pulls out unexpectedly.
10. Minimum of moving parts,



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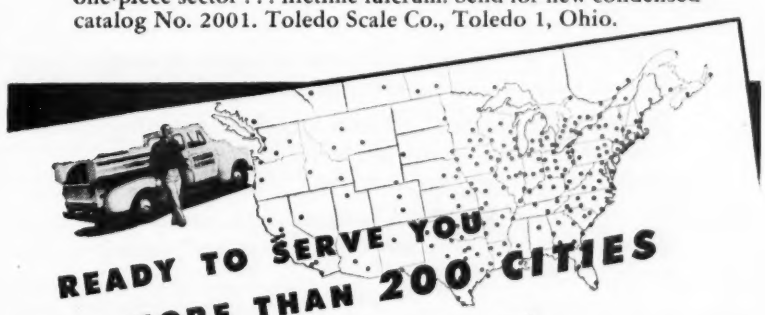

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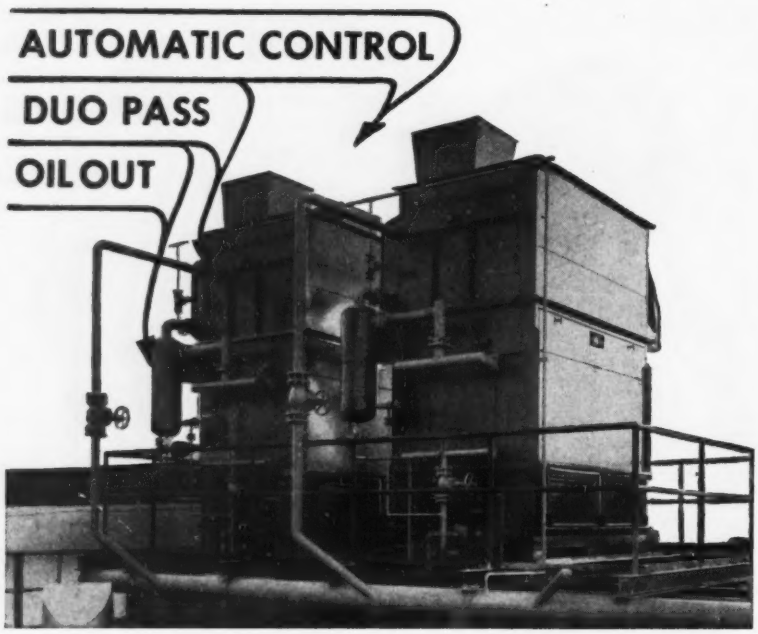

SAVE HALF THE ENGINEER'S TROUBLES ...WITH A REFRIGERATION PLANT

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch the costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

"The Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

Write for Bulletin 103; Address Dept. F.I.

You can see one of these installations near you.

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District Engineers in Principal Cities of United States and Canada

sealed wherever possible to discourage tampering, plus simple pushbutton controls clearly marked to insure against errors by operators.

11. Critical clearance (overall width) of layover arms not to exceed 6 ft. (maximum allowable width of trucks or trailers is 8 ft., and usual inside door opening is approximately 7 ft).

Benefits Cited

Plant men should compare their costs of vehicle-dock transfers with their costs of handling with the same equipment on unobstructed floor space. This simple check often will provide a striking picture of the need for added dock handling facilities.

Many firms have discovered that adjustable ramps permit more highway trucks to be worked per dock space, effecting a corresponding saving in floor space and dock labor. They also promote safety through minimizing strained muscles and handling accidents.

Moreover, users also have discovered that, where large quantities of freight are handled, amortization time often is surprisingly short.

End (*Resume reading on page 92*)

Production Streamlined

—*Continued from page 76*

with thermostatic controls that constantly maintain the temperature of the wine at 145 F. If the temperature drops below this level, wine is automatically returned to the jacketed mixing tanks.

Bottling on each line is carried out in this manner: Cases of empties (4 oz., 6 2/5 oz., 10ths, pt., 5ths., qt., ½ gal., and 1 gal.) are dumped onto an unscrambler. Empty cases are belt-conveyed on a line running over the bottling line and to the case-packing station.

Empty bottles continue through a U. S. Automatic rotary, vacuum filler with 36 filling spouts. Filled bottles next are conveyed to a Resina automatic screw capper and two side-by-side World Straightline labelers.

Bottles then are packed into shipping cases that are automatically glued and sealed. Cases are loaded onto pallets for fork-truck movement to finished-goods storage. Additional storage of 150,000 cases is provided in an adjacent building.

Cased wines are shipped in insulated box cars as a precaution against exposure to extreme temperatures, especially in the event that the cars are side-tracked.

End (*Resume reading on page 77*)

Questions & Answers

THIS MONTH'S PROBLEM

Chlorinating Cooling Water

Question — We are giving some thought to chlorinating the water in our cannery's cooling canals. Can you give us some idea as to the concentration of chlorine we would have to establish, and what it might cost us to chlorinate this water?

JUNE PROBLEM

Ejecting Empties on Carton Line

The Question Was—We are searching for a simple method of automatically ejecting empty cartons conveyed from a four-scale net weigher to an automatic case packer. Can you help us on this subject?

Answer—A simple, yet trouble-free, method of ejecting empties from your line is to install an air-jet device somewhere before the case-packing or loading machine.

This device is easy to install. Needed is a small pipe (about ⅜ in.), which is hooked up to an air compressor and supported by a bracket so that air from the discharge end of the pipe is directed on cartons conveyed to the packing station. To regulate flow of air, you might install a petcock as well as an air-pressure gage.

Cans Stain

Question—We have recently encountered staining of tin cans—surfaces are discolored except for bright spots of circular shape and in a regular pattern. Can you suggest the possible cause, and a correction?

Answer—Your problem resembles a case recently investigated by one of the large can companies and found to be attributed to electrolytic corrosion.

Contact between iron retort crates and tinned can surfaces creates, under certain conditions, a galvanic cell. You will note that the bright spots correspond in size and spacing to retort-crate perforations, and they occur where there is no contact of dissimilar metals. Having some bearing on this condition is the electrolytic tinplate, which has a thinner tin coating than the older hot-dipped plate.

What apparently promotes this type of corrosion is alkalinity in the steam which, in turn, is caused by "carry-over" from the steam boilers. Carry-over may be due to such mechanical causes as high water level or excessive steam-exit velocity. Too, it may be attributed to such chemical causes as high solids, high suspended solids, or high alkaline content of boiler water, or substances such as oil that promote foaming within the boiler.

We suggest that you make a thorough survey of your boiler-feed water conditions and boiler operation to locate which possible cause is responsible. The correction will depend upon your findings, and may lie in improving your boiler water-level control, enlarging steam mains, filtering feed water, or chemically treating the feed water.

Olives Discoloring

Question—We have experienced discoloration of olives at the top of brine-filled jars. Can you account for this condition and tell us how to avoid it?

Answer—Discoloration may occur if olives are exposed to air. And it sounds as if this might be your trouble, since you mention that it is found at the top of jars.

It does not, of course, mean that your caps are not air-tight sealing the jars, which would certainly be unlikely.

What is more likely is that the topmost olives are not, for some reason, being completely covered by the brine. This can easily happen if a little brine spillage takes place between brining and capping operations, especially if the fill of olives is too high in the containers. As brine is relatively inexpensive, such spillage might go unnoticed.

This may be corrected in either of two ways. One is to make sure that the brine completely covers all olives.

How Would *You* Do It?

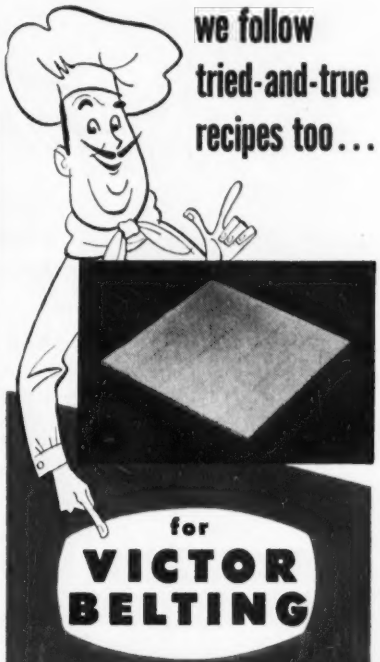
Readers are invited to submit to FOOD ENGINEERING answers to "This Month's Problem."

Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

What is *Your Problem?*

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.



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for VICTOR BELTING

Exact measures of the best materials—careful processing techniques—they're as much a part of making Victor Belting as they are of making your food products.

To make sure that we're following the *right* recipes, our research department keeps careful, continual checks on *everything* that goes into Victor Belting and *every purpose* for which it's used. That's why—with complete confidence—we recommend for *your* food handling:

VICTOR SUPRENE... special-woven cotton duck belting thoroughly impregnated with exclusive Neoprene compound. Waterproof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

VICTOR 475...highest quality solid-woven cotton belting impregnated and coated with a special Neoprene compound. Developed for use where laboratory cleanliness is a *must*. Washable with hot water or steam. Resists rancidity and deterioration.

For food handling the modern sanitary way select from—

A COMPLETE LINE Including:

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These products—plus an endless variety of others are package-wrapped

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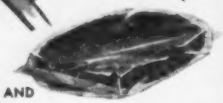
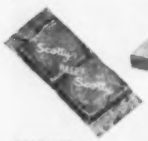
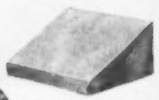


MEATS AND BACON





DAIRY PRODUCTS

CANDIES & CONFECTIONS

BAKERY PRODUCTS

CITRUS FRUITS & VEGETABLES

AUTOMATIC — continuous rotary motion provides amazing, new, high speed wrapping production — eliminates counter-acting motion that causes material breakage and machine down-time.

"FLOAT" WRAPPING — packages products of regular or irregular shape *without* breakage or crushing whether product is hard, soft, firm or brittle. Size change-overs accomplished with minimum down-time.

POSITIVE SEALING — by heat, glue or crimping keeps moisture where you want it—in or out. Sanitarily protects against dirt, dust and handling. Ends may be flared, folded under or diamond folded — longitudinal seams heat or glue sealed.

SAVES LABOR . . . MATERIALS — push button, *automatic* feeds permit one person operation and tending of several machines at the same time. And, because no stiffeners are required, *unless desired*, savings of 25 to 50% in materials are effected.

USES ALL MODERN WRAPS — Cellophane, glassine, foils, films, polyethylenes and others. Electric registration accurately positions pre-printed or attached labels.

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We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.

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This may require special attention by the packers, involving pressing the olives down into the jar or using a rapper or vibrator on the briner infeed to settle the olives to a minimum volume. It will also call for an overflow brine fill, followed by smooth and gentle handling to minimize spillage until jars are capped.

Other possible approach is to use a vacuum-type seal to eliminate as much air as practical in the headspace. Vacuum-sealed jars will seldom, if ever, show discoloration, even if the brine does not completely cover the olives. Reason is that there is insufficient oxygen present.

One word of caution: If the vacuum seal is chosen, a large-diameter cap may be rather difficult for the consumer to remove. Atmospheric pressure on a large cap holds it in place with surprising force.

Losing Flavor Cooking Jam

Question—We have always noted considerable cooked fruit odors when preparing jams in an open kettle. However, since installing a vacuum pan, this odor is no longer detected. Yet, the odor and flavor of our vacuum pan-cooked jam is no better than that formerly prepared in kettles. Have you any idea what's happening to the aroma and how it might be retained in jam prepared in the vacuum pan?

Answer—The volatile flavors and odors, which were formerly lost to the atmosphere, are now drawn out of the vacuum pan with the water vapor. Most of them are then dissolved and carried away in the condenser water.

You are certainly thinking along the right line in wanting to retain these flavors and odors in your product. But we know of no practical method of retaining them during the cooking operation because of their volatility.

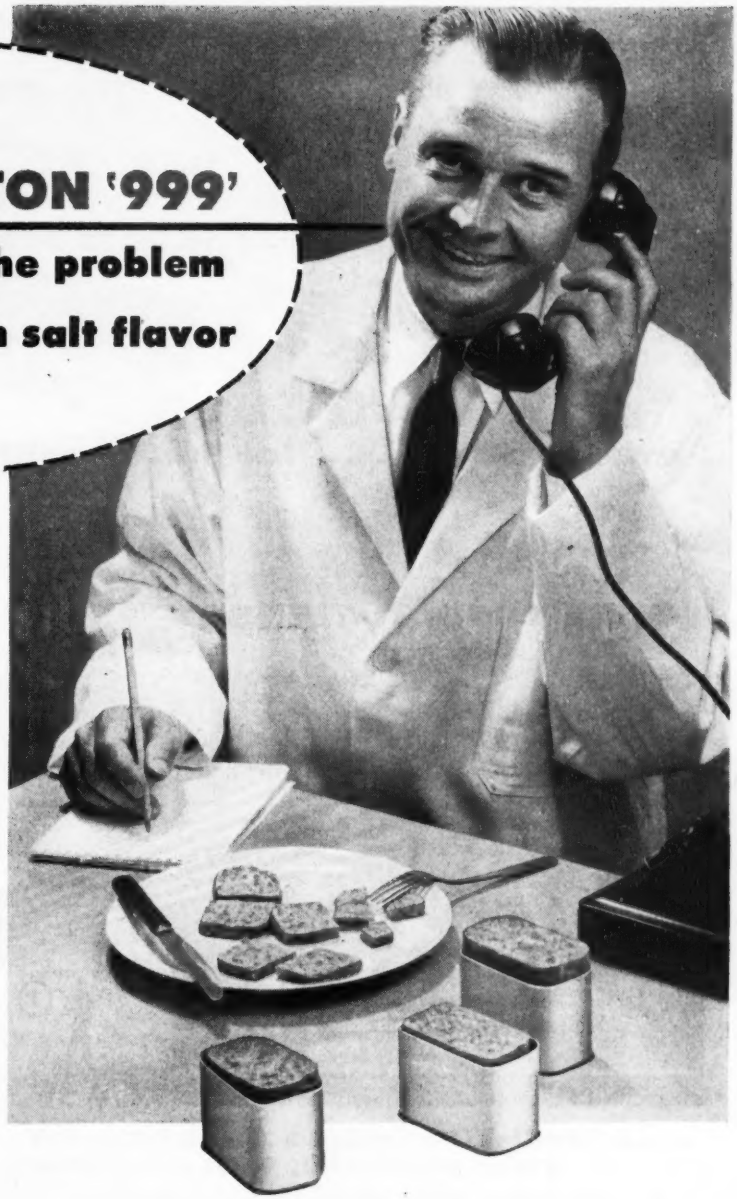
Best we can suggest is the procedure that the Eastern Regional Research Laboratory (USDA) has publicized. It involves condensing all vapors escaping during cooking, stripping these volatiles from the condensate by fractional distillation, and

---

Q. We use high-pressure steam to peel potatoes. What can we do to prevent formation of a reddish discoloration by the time the spuds reach the trimming table? How's it caused?

A. Try pre-heating or immediate blanching to inactivate enzymes responsible for this darkening. These enzymes are beneath the ☆ to ½ in. cooked surface of the potato, and high-pressure steaming heat-activates them.

Tom, that MORTON '999' sure has licked the problem of getting uniform salt flavor



Yes, Morton '999' Salt is needed in canned meats to prevent quality variations. It should also be used by the makers and processors of candy . . . beer . . . canned foods . . . cereals . . . seasonings . . . pasta products . . . malted milk . . . mayonnaise . . . margarine . . . olives . . . sauerkraut.

MORTON '999' SALT

insures uniform quality

in processed foods for two reasons. It's guaranteed to contain more than 99.9% pure sodium chloride — *always*. The 0.1% (or less) is guaranteed to be neutral inert sodium salt—never bitter calcium or magnesium compounds.

Vacuum pan evaporation guarantees that this salt will be clean . . . free flowing . . . evenly soluble. It has a constant weight per volume ratio . . . won't pack down.

MORTON '999'

the salt that carries its own guarantee

MAIL COUPON FOR FURTHER DETAILS TODAY!

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Industrial Division, Dept. LE-8
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I should like to receive—without obligation—more information on Morton '999' Salt and methods of using it in my product.

Name_____

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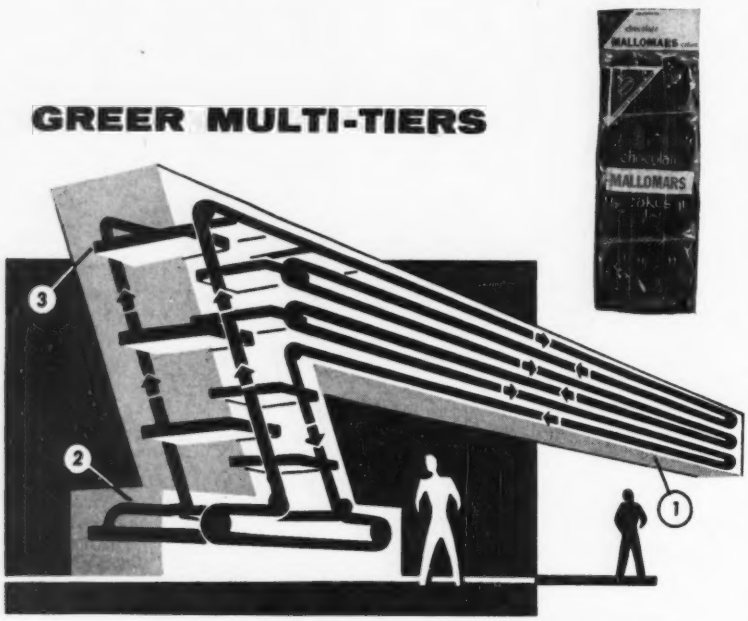
For more information, use coupon on page 187.

these well-known products are

made better . . . for less, with

GREER MULTI-TIERS



. . . a Multi-Tier will do the same for your products, too! . . . CONVERTS your heating, cooling, drying, and similar operations from batch to continuous processing. PROCESSES your products under exact time, temperature, and atmospheric control. HANDLING reduced to minimum.

1. Saves floor space — makes profits from unused overhead space — ample headroom.

2. Multi-Tier trays convey products through processing cycles of 10 minutes to 10 hours without jar or jolt. Automatic or manual loading and unloading.

3. Trays always perfectly level — permanently attached to positive chain drive. Custom built to fit your product.

New 8-page bulletin tells how a Multi-Tier will make your products best, for less. Write today.

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GREER

re-incorporating the volatile essences into the jam.

It is evident that you must first put in a surface condenser to remove all condensate and provide a tank of adequate storage capacity for this condensate—which, of course, is chiefly water.

Best is reported to be the vertical shell-and-tube type condenser with the vapor inside the tubes.

It is essential to use cold water for the condenser in order to cool the volatile-containing condensate to 60-80 deg. F. Non-condensible gases contain volatiles that can be recovered by scrubbing with cold water and then returning to condensate.

Stripping volatiles is, of course, the heart of the process, and space does not permit going into detail here on it. For more information on this subject, we refer you to the Eastern Regional Research Laboratory.

Before undertaking this process or adding any of the recovered essences to your products, make certain that you cover this matter with the FDA to ascertain compliance with the standards of identity for jams.

You will also have to carry out considerable experimentation to determine the correct amounts of essences from various fruits that must be added to your products. Reason is that some are more potent than others.

Selecting Sugar System

Question—More and more, we are reading about the adoption of liquid sugar and bulk dry sugar handling systems in various food plants. However, the more we study these systems, the more confusing the picture becomes. Too, in the matter of bulk sugar some installations feature air conveying, while others use screw and bucket conveyors. Some provide tremendous storage capacity, while others apparently get by with little. Could you offer us a few general principles for our guidance in analyzing what would be best for our own operations?

Answer—This is a rather broad subject to treat in limited space, but perhaps the following remarks will help you get started.

First, it is necessary to consider each installation on its own merits. What may be ideal for a candy manufacturer in a coastal port may not be suitable for a bakery a thousand miles away from a sugar refinery.

Your decision between liquid and dry sugar will depend upon whether your product will contain water, must have water removed by evaporation or drying, or your ability to pay freight on water. If these factors permit use

of liquid sugar, it is generally true that tanks, pumps, pipe lines, and meters for receiving, storing, and dispensing will cost less than dry bulk sugar facilities.

If dry sugar is indicated, it is well to consider the pros and cons of pneumatic and mechanical conveying equipment. You will find that each has its proponents, and this department has no desire to take sides.

If the same car- or truck-unloading facilities and conveying lines are to be used for sugar and other bulk materials at different times, pneumatic equipment will be easier to clean and change over from one product to the other. However, if the installation covers considerable distances and points of distribution, the small pipes of a pneumatic system may be easier to fit into an existing building than screw conveyors or bucket elevators. On the other hand, for short direct runs, the initial cost of the latter will usually be lower. The electric power for operating mechanical conveyors is almost always considerably less than that required for a blower or suction fan.

Storage bins admittedly can be a problem. You will want to keep enough sugar on hand for normal needs between deliveries. The amount will have to be figured out, taking into consideration the transit time from the refinery and the availability of suitable trucks or rail cars. You will want to allow a reasonable margin of safety for uncontrollable delays in transit, etc.

It is good practice to construct a bulk system with emergency dump hoppers where bagged sugar could be added in an emergency.

Where land is available and climate permits, it is sometimes convenient to provide outside storage silos. On the other hand, the use of portable bins which can be moved by power truck gives a high degree of flexibility and may be advantageous where more than one kind of sugar must be stored, or where there are several scattered usage points not readily connected by conveyor.

Q.—Can flat-sour spoilage be checked by adjusting the acidity of canned tomato juice?

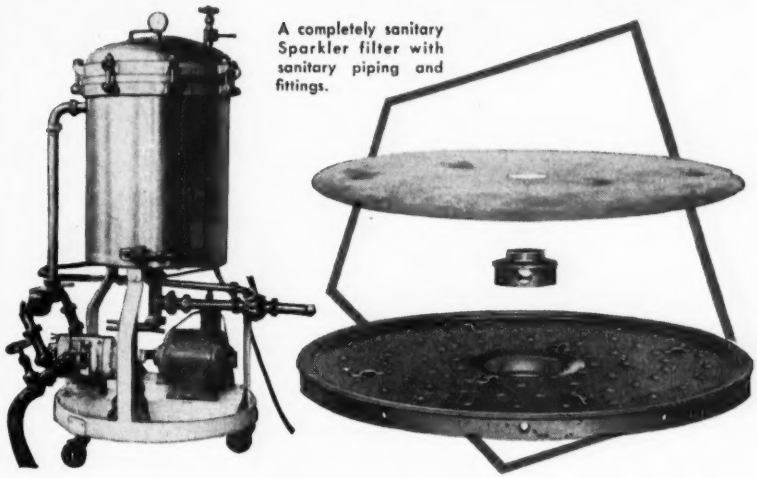
A.—Germination of the spore-forming bacteria, Bacillus coagulans variety thermoacidurans, can be inhibited by adjusting the pH of heavily contaminated juice to 4.25 and lightly contaminated juice to 4.30. However, approval has not been given by federal agencies to standardize tomato juice with edible organic acids like citric.

COMPLETE SANITATION

is a feature of the special sanitary

SPARKLER FILTER

of particular interest to food processors



A completely sanitary Sparkler filter with sanitary piping and fittings.

You can see at a glance why Sparkler filter plates are the most sanitary plates ever designed.

All surfaces, inside and out, are easily accessible for thorough cleaning. The top screen that supports the filter paper, a center separator, and the bottom plate is all there is to it. These parts can be separated without unscrewing bolts or nuts. The tie rods of the complete plate assembly holds the plate parts firmly together without danger of bypassing.

With most other types of filter plates the inner surfaces are inaccessible and cannot be cleaned; contaminating food particles are locked in and the first run of a new batch frequently must be discarded or rerun through the filter to obtain a pure product.

With Sparkler sanitary plates, a pure product is obtained right from the start, and continues pure with fine sharp filtration to the end of the filtering cycle.

Sparkler filter plates can be removed for cleaning in one unit and a fresh thoroughly clean set lowered into the filter tank. This reduces down time to a matter of minutes.

Sparkler filters are available in stainless steel, monel, nickel, bronze, or Hastelloy, steam or brine jacketed. Available in a range of capacities up to 10,000 G.P.H.

They are efficient in filtering all food products such as:—

Candy Scrap	Liquors	Lard
Chicken Broth	Milk	Deep Frying Fats
Cider	Molasses	Beet Sugar Syrup
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Extracts	Vinegar	Wines
Flavors	Fruit Juices	Whiskies
Honey	Alcohols	
Gums	Beverages	

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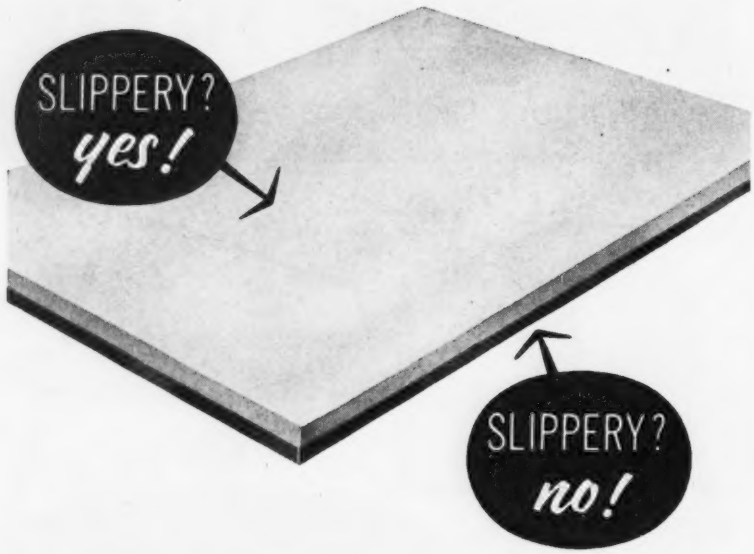
Service representatives in principal cities.

For personal service on your filtration problems Write . . . Mr. Eric Anderson

For more information, use coupon on page 187.

New Material Revolutionizes Food and Package Handling



Cementable TEFLON (Patents Pending) a material so slippery on one side, nothing will adhere to it—not even the stickiest food product—and receptive on the other side to permanent cementing by commercial adhesives to any other material, is proving a boon to food manufacturers.

Cemented to steel guide rails of conveyors and packaging machines, food products are not damaged, packages are unmarred, no "jam-ups" occur in handling operations.

Cemented to table tops—clean up time is reduced to a minimum and sanitation is greatly improved because TEFLON sticks to nothing, is non-absorbent, tasteless, odorless, inert, non-contaminating, bacteria free.

Cemented to machine hoppers as a frictionless lining, dry powders and other materials flow freely—do not "bridge over". Vibrators are unnecessary.

Find out about this material that contradicts itself to serve food manufacturers better.

Write for Bulletin No. GR-301 that describes TEFLON faced Steel Guide rails for all types of food handling equipment. Write for Bulletin No. MI-443 that describes cementable TEFLON for many other food plant purposes.

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FABRICATORS OF duPont TEFLON
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Representatives in Principal Cities Throughout the World

Controlling Flies

Question—Can you provide me with a list of steps to follow for keeping flies out of our plant?

Answer—Here are eight steps to follow during the fly season:

1. Spray your loading and receiving docks with an approved insecticide at least twice daily—before operations begin in the morning and again at the noon break. Also spray the entire plant during weekends, keeping foods out of the plant at the time.
2. Screen all windows and doors, making certain that damaged and loose-fitting screens are immediately repaired. Also, periodically check screens.
3. Calk or cover spaces around pipes entering the plant.
4. Plant fly traps in strategic points outside and within 100 ft. of the plant.
5. Get rid of refuse as promptly as possible, keeping it covered until removed.
6. Use overhead electric fans that blow outward and downward through screened doorways.
7. Screen ventilators, since food odors and warm air currents attract flies.
8. Check louvered exhaust fans to make certain the louvers are lubricated and that they freely open and tightly close.

Chili With Beans

Question—Do you have a formula for making chili (with beans)?

Answer—Here's a formula: Lean beef, 18 lb.; water, 21 lb.; fat, 4½ lb.; tomato puree, 4½ lb.; diced onions, 3 lb.; spice mix, 18 oz.; flour, 15 oz.; and Idaho Pinto beans, 12 oz.

Spice mix consists of dry chili pepper, 12 oz.; salt, 8 oz.; paprika, 4 oz.; Mexican oregano (sage), ½ oz.; red pepper, ½ oz.; and garlic powder, ¼ oz.

Boiler Plant Instruments

Question—Would you please tell us what instruments are considered necessary for efficient operation of a small boiler plant? We have a stoker-fired, water-tube boiler rated at 300 hp.

Answer—We assume you are interested in the basic indicating or recording instruments that will enable your firemen to operate efficiently and give you data to calculate performance efficiencies, rather than any integrated automatic control system.

Measuring fuel usage is necessary if you are to know heat input to your boiler system. Required are a coal scale—probably a "weigh larry" between bunker and stoker hopper—and

MONOPLAST . . . *a new, one-coat insulation finish for cold room walls and ceilings*

Monoplast is an entirely new, light-reflective white finish for cold rooms. Trowelled on in just one coat, it dries to a durable surface for all temperatures to 80° F. below zero. Monoplast reflects 72% of the light that strikes its surface, resulting in an exceptionally bright cold room interior. Its resilience and strength protect the insulation from abrasion. Monoplast is easy to maintain.

A Monoplast finish is completely monolithic, with no score marks to mar its surface. It needs no painting and can be washed with water and commonly used cleaning agents. It weighs only about one-fifth as much as two-coat portland cement plaster and can be applied to ceilings as easily as to walls.

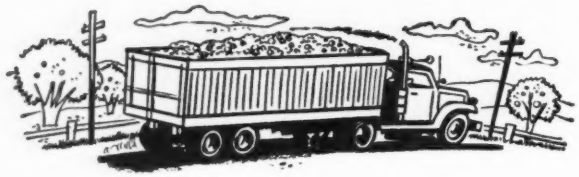
This new finish is available through Armstrong's Contract Service. It is one of the new products of Armstrong's research that are simplifying application methods in the industrial insulation field.

For full details on Monoplast and Armstrong's Insulation Contract Service, call the Armstrong office nearest you or write today to Armstrong Cork Company, 203 Stratton Street, Lancaster, Pennsylvania.

Applied by trowelling, one coat of Monoplast provides a tough, durable cold room finish that will last for many years. Armstrong's Monoplast eliminates the necessity of scoring and painting the walls.

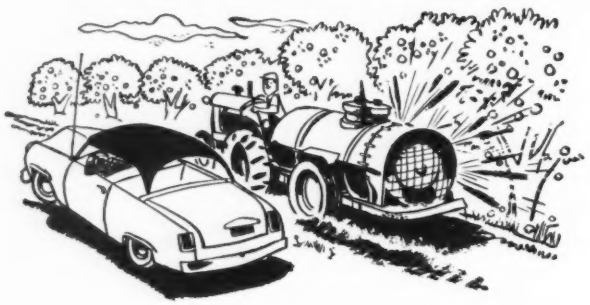
ARMSTRONG'S INDUSTRIAL INSULATIONS

12 REASONS FOR G-E 2-WAY RADIO AND CONSTANT "HOUSE" CONTROL



- Co-ordinate the flow of produce for processing
- Eliminate deadheading . . . obtain payloads every trip
- Gear your picking to "house" capacity perfectly
- Unify all sales, loading and produce operations

- Convert idle hours to picking time
- Re-route crews and equipment
- Control harvested *quantity*—reduce spoilage
- Relay new orders to fields instantly



- Insure top *quality* via contact with field buyers
- Start or stop work in seconds
- Speed vehicle repairs . . . dusting . . . fertilizer etc.
- Know crop maturity virtually as fast as the field does

Actually, there's no limit to the number of ways mobile radio will improve food processing efficiency. You can think of a dozen more than those listed here. And, each can save one or one thousand man-hours . . . a hundred or many hundreds of dollars depending on the size of your operation.

For completely new processing efficiency, see General Electric 2-way radio communications in action. Compare performance . . . compare features of all mobile equipment and watch the points pile up for G.E. A phone call now to our local sales office is the first step . . . the right step toward achieving *constant control.* Or write: *Section X7084, General Electric Company, Electronics Park, Syracuse, N. Y.*

2-WAY MOBILE RADIO

FREQUENCY STABILITY & SELECTIVITY
guaranteed for life!

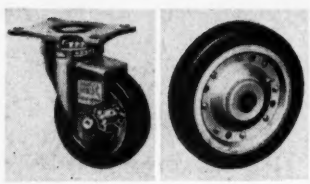
Progress Is Our Most Important Product

GENERAL ELECTRIC

best for food plants

DARNELL
CASTERS & WHEELS

PERFORM MORE EFFICIENTLY AT LOWER COST AND LAST LONGER!



Darnell Casters assure...

1. LONGER EQUIPMENT LIFE
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...OVER 4000 TYPES of CASTERS & WHEELS

There is a type of Darnell Caster or Wheel for every kind of use and floor. Made for light, medium and heavy-duty service, you are sure to find in the Darnell line the exact caster or wheel to meet your individual requirements.

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a printing attachment to keep a record of weights.

Feed water-input measurement requires a meter. A feed-water thermometer is also needed if the heat in the feed water is to be measured, and this may serve a double purpose in also indicating extent of deaeration (if your feed-water heater is an open one).

Probably the instrument of greatest value is a steam flow meter, especially one that also includes an air flow meter. Such a dual-purpose recording instrument enables the fireman to proportion air-to-fuel ratio and contributes greatly to efficient operation.

A flue gas thermometer will not only show heat losses to the stack, but will also give a good indication of the cleanliness of equipment. Finally, draft gages are needed to show pressure drop through various parts of equipment and to give an indication of such undesirable conditions as ash deposits on the tubes.

In addition to the foregoing (which should be read frequently so that a complete log is available at all times), another instrument is of value for periodic checking on boiler plant efficiency. It is a flue gas analyzer, such as an Orsat apparatus.

One further word: The frequent analysis of both fuel and ash is also helpful in maintaining top efficiency. Usually, for a small plant, it is practical to have these analyses made by an outside laboratory.

Q.—I am packing rendered chicken fat in cans and glass jars, and would like to dehydrate this fat for packaging in flexible-type paper or foil pouches. Can you tell me how?

A.—We haven't heard of a dehydrated chicken fat. When rendered at least an hour at 235 deg. F., chicken fat should be "dehydrated" or practically moisture-free.

Perhaps you are referring to a spray-dried chicken fat powder, which is prepared by blending sugar or milk solids with chicken fat and then running the mixture through the dryer. Amount of sugar or milk solids added will have to be determined by analysis. An emulsifier is sometimes added to facilitate subsequent dispersion of the fat.

Needs White Coating

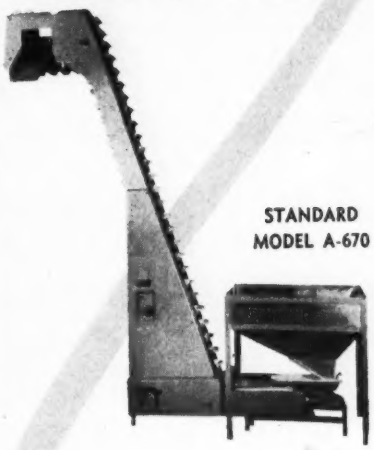
Question—Can you furnish me with a formula for a white enrobing coating? The coating must have a high gloss and withstand summer conditions.

Answer—First, we suggest you get in touch with manufacturers of summer coatings. These manufacturers maintain technical staffs anxious to

IF YOU WORK WITH FREE-FLOWING SOLIDS AND POWDERS

You'll Want to Know More About

ROBO-LIFT ELEVATING CONVEYORS



STANDARD MODEL A-670

With a Robo-Lift, it's easier to keep pace with high production schedules. Handling time and damage are cut to the bone, and costs, too! That's because Robo-Lift assures the gentle, sanitary movement of material and finished products vertically and/or horizontally—with a minimum of time and attention.

Write today for complete information. A Counsel Representative will give your inquiry his personal attention

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Two Methods for Testing Peas

Question—Which is the better instrument for measuring the quality of raw peas, the maturometer or the tenderometer?

Answer—Actually, the most accurate method of determining the quality of raw peas is to analyze them for alcohol-insoluble solids (AIS)—starch and celluolosic materials that increase in amounts with maturity.

Researchers at Cornell University evaluated both instruments. When correlated with AIS, they found that both satisfactorily measured the quality of raw peas, within limits of accuracy of field sampling. Normal was a variation of 6 or more tenderometer points and 30 or more maturometer points between samples from different portions of the field.

There were greater variations in maturometer readings of duplicate samples than similar tenderometer readings.

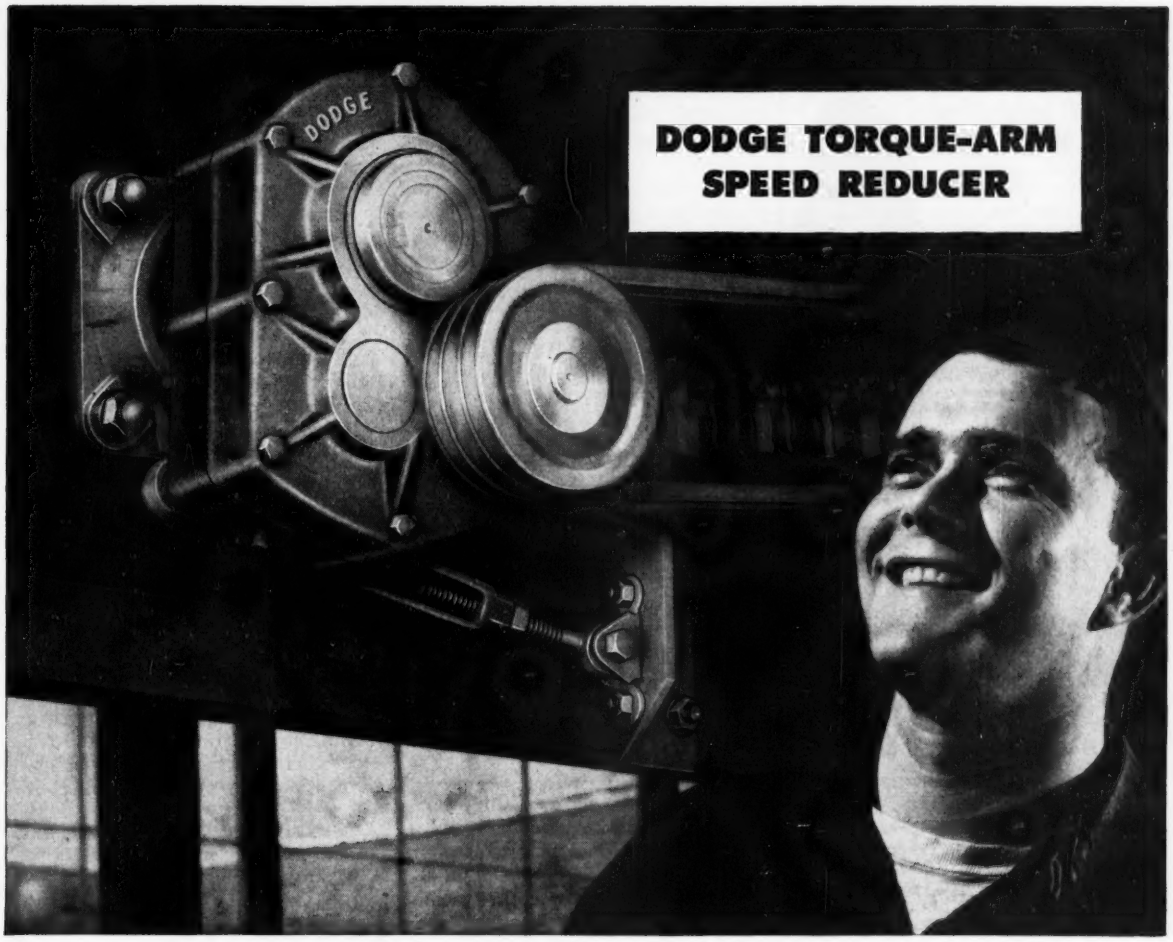
The maturometer is portable and hand-operated. It also costs a little less than the electrically-operated tenderometer.

Ratproofing Buildings

Question—We are making a special effort to improve sanitary conditions under which our products are manufactured and stored. Hence, we'd appreciate any advice on making our buildings ratproof.

Answer—We suggest that you make a thorough inspection of your buildings, with particular attention to basements, to discover possible places where rats might enter—existing openings or holes gnawed through wood or similar construction materials. Also note dark and inaccesible areas likely to harbor rodents once they gain access.

Look for poorly-fitting doors and windows, floor drains with broken or missing drain plates, openings around pipes or conduits, and poorly-pointed masonry joints. Screen windows and ventilators or provide gratings for them with openings not over ¼-in. square. Be certain that doors fit snugly and that metal sheathing is applied around bottom of doors. Install automatic door closing devices. Replace drain plates, as necessary, and



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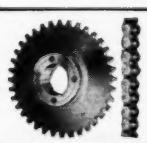

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fill openings around pipes with cement mortar.

If the construction is a frame one, protect undersides of joists, plate, and floor with sheet-metal flashing or fill space between studs with about 8 in. of concrete.

Harborage areas, such as boxed-in plumbing, cabinets, stairways, and false ceilings should be removed, where practical. Otherwise, they should be opened up as much as possible or ratproofed with concrete or metal flashing.

The U. S. Fish & Wildlife Service has bulletins on this subject.

Dry Ice Cooling

Question—*We have heard that use of dry ice in rail shipment of fresh fruits is beneficial when used in conjunction with normal water-icing of refrigerator cars. Would you please explain?*

Answer—Research by the USDA has proven that dry ice exerts beneficial effects—apart from its refrigerating effect which mainly "stretches" the water-ice supply. Use of 1,000 lb. of dry ice in a car for a long trip results in a rapid build-up in the concentration of carbon dioxide gas. Concentration may reach 25% by the first day and then gradually drop since cars are not usually gas-tight.

Carbon dioxide is beneficial because it inhibits mold growth and rot and also softens fruits. It also slows down the respiration rate of fruits and thereby retards ripening. The latter has the unexpected property of carrying over for a time after fruits are removed from the carbon-dioxide atmosphere.

In practice, dry ice is generally used in conjunction with precooling of the fruit. It is usually loaded into the car near the top (at the center), in 50-lb. bricks that are wrapped in heavy paper. Wrapping simplifies handling, and retards evaporation.

Whether you will want to use this method will depend in a large measure on whether the quality improvement will justify the added expense.

Q.—Upon opening jars of strawberry, cherry, and other fruit preserves, small mold buttons sometimes appear on the surface of the products. How can we prevent them?

A.—After capping, labeling, and casing operations, immediately invert the cases capside-down so that the inside of the cap is sterilized by the hot preserve. Or you may rig up some infra-red lamps directly over the conveyor taking jars from the capper.

Selecting a Filler

Question — We are considering mechanizing present hand-filling of frozen cut corn. Can you tell us what type of filling machine can do this job. About what speed might be attainable?

Answer—Filling machine manufacturers state that this is one of the products that can be handled in a volumetric filler of the type having adjustable, telescopic measuring pockets. Such machines were formerly built in 4, 6, and 8-pocket sizes, but today are available up to 12 and 15 pockets.

It is difficult to predict exact speed as it is partly dependent upon characteristics of the product and, partly, upon the size of container. However, about 20 containers per minute per pocket might be reasonable for an average size container.

It might be well to point out that such a product might tend to bridge in the filling-machine hopper. Usually, a solution can be worked out with the machine manufacturer, making use of an agitator in the hopper, or even a rotating or oscillating hopper.

Another point worth noting (if you are considering a mechanical filler) is

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the location of the supply hopper. If it is directly above the filler hopper, then the weight of product may effect the accuracy of fill weights—especially as the product level changes.

A common way to overcome this problem is to have one hopper offset from the other. In this way, the full weight of product in the supply hopper is not transmitted to the filler.

Finally, it should be kept in mind that intermittent operation of a filler on a material of this nature has a disturbing effect upon uniformity of fill weights. The smoother and more continuous the operation, the better weight control you will have.

Vexing Cleaning Problem

Question—Can you suggest a good method of treating concrete floors in warehousing areas to prevent dust and to make cleaning easier?

Answer—There are two simple, recognized treatment methods. In either case, the floor should first be swept clean and, if necessary, mopped and allowed to dry. Then treating solution is poured on the floor, a little at a time, and spread evenly with a broom or mop. Usually two or three coats are required for complete treatment.

One treatment involves the use of silicate of soda—one part dissolved in two parts of hot water. When this solution is spread on the floor, make certain that all puddles are brushed out in order to avoid white spots due to uneven drying and crystallization. If properly applied, coating will not be visible, yet it will seal pores in the concrete.

Since dirt forms on this surface, it is customary to apply another coat instead of sweeping. The same is true for the third coat. Actually, any number of coats can be used, but it is important not to make a solution any more concentrated than indicated above, as a heavier one will not properly penetrate the concrete.

With the other treatment, a solution is made up with 2 lb. of magnesium fluosilicate and not less than ½ lb. of zinc fluosilicate per gallon of water. A wood or glass container should be used, and personnel applying the solution to floor should wear rubber overshoes.

First and second coats consist of a mixture of equal parts of this solution and water, which are applied at a rate of 1 gal. per 100 sq. ft. Allow 24 hr. for drying between coats.

Third and final coat consists of the full-strength solution applied at the same rate—1 gal. per 100 sq. ft. After 24 hours' drying, any residual solution is removed by sweeping.

Recipe for frozen French fried profits: Cyclone Belts

• This firm reported improved quality, faster production, lower costs with Cyclone Conveyor Belts. One belt carries the potatoes through the fryer and then transfers them to a second belt which permits excess grease to drain off as the potatoes are being air-cooled en route to the packaging and freezing operations. These ultra-sanitary belts can be fabricated either from USS Stainless Steel or from uncoated carbon steel wire.

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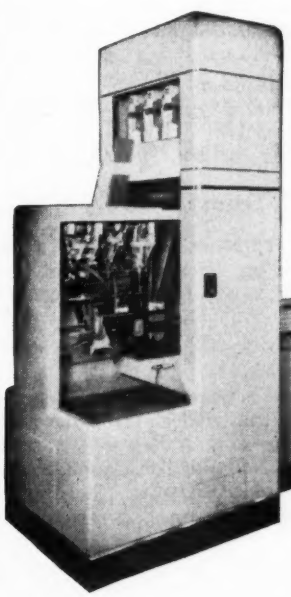

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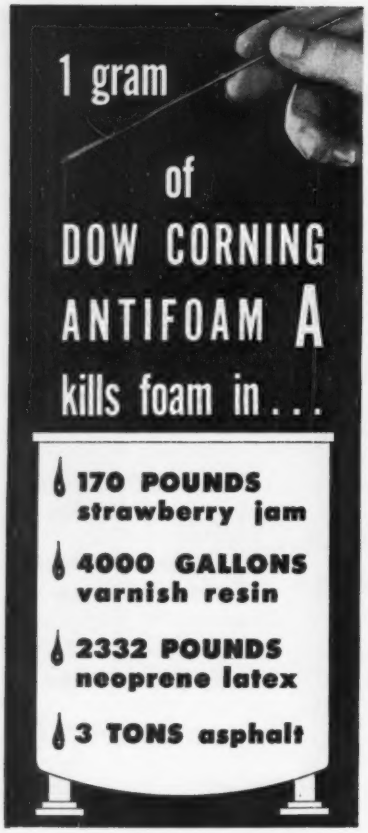

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Practical Quality Control Manual

QUALITY CONTROL. *By Norbert L. Enrick. Published by Industrial Press, 148 Lafayette St., New York 13, 1954. 181 pages 6¼x9¼ in., cloth. Price:* $4.00.

First published in 1948, this book is a new and greatly enlarged version. Designed to be practical and easy to understand, it offers an abundance of examples based on the authors wide experience in the installation of quality control procedures. The book presents data on sampling plans, control charts, compressed limit gages, equipment, and the theory of quality control.

New information added to the work includes additional control charts for variables, control charts for defectives, control charts for acceptance inspection, and analysis of variance. The book is illustrated and indexed.

Poultry Processing

THE BACTERIOLOGY OF COMMERCIAL POULTRY PROCESSING. *By M. F. Gunderson, H. W. McFadden, T. S. Kyle. Published by Burgess Publishing Co., Minneapolis 15. 1954. 103 pages. 8½ x 11 in., paper, spiral bound. Price:* $3.00.

Written under contract with the USDA, this report is a must for processors and technologists concerned with the poultry industry. Covering research work in actual plants, the book is fully illustrated with graphs and tables. Among topics covered are dressing and evisceration procedures, plant worker and processing equipment, and packaged, finished poultry products.

Heat Transfer Book

HEAT TRANSMISSION. *Third Edition. By William H. McAdams. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. 1954. 532 pages. 6¼ x 9½ in., cloth. Price:* $8.50.

Thoroughly revised to include recent advances in the field, this authoritative reference work is designed to provide a clear and up-to-date treatment of all phases of heat transfer, along with a critical evaluation of the data.

Most important change is the revision of a chapter on radiant-heat transmission. The section on gas radiation includes recent charts for evaluating emissivity due to sulphur dioxide and water vapor charts have been expanded to permit estimation of radiation at ultra-high gas temperatures.

Added chapters include those dealing with natural convection, compact exchangers-packed and fluidized systems, and high-velocity flow, and rarified gases. Illustrated with charts and graphs, the book contains a complete bibliography as well as a subject and author index.

Lab Safety Guide

SAFETY IN THE CHEMICAL LABORATORY. *Prepared by General Safety Committee of the Manufacturing Chemists Assn., Inc. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. 1954. 234 pp. 5¾ in. x 8½ in., cloth. Price:* $4.25.

The dangers involved in the handling and storage of chemicals can be offset only by properly acknowledged safety rules. This work offers detailed suggestions and safety procedures that have been tried and found successful. Information is offered on the handling of chemicals, protective equipment and devices, contamination control, and extends to elementary first aid instructions.

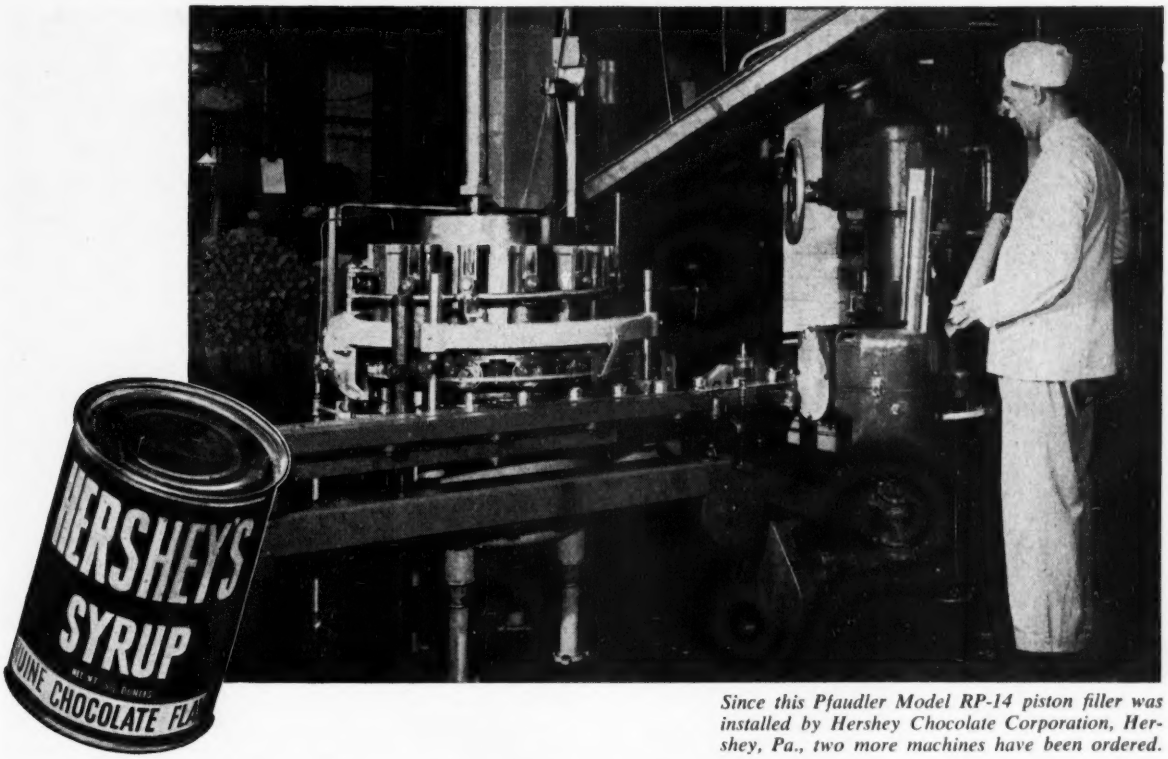
The book is of value to all engaged in laboratory work and those concerned with plant management. It is illustrated and indexed.

Government Food Survey

SURVEY OF FOOD AND NUTRITION RESEARCH IN THE UNITED STATES OF AMERICA, 1952-53. *Prepared by Food and Nutrition Board, National Research Council. Published by USDA. 1954. 372 pages. 7⅜ x 10¼ in., paper. Price:* $1.75.

Progress in the food and nutrition fields and the part played in this advance by research, is the subject of this well documented book. Over 4,800 research projects are listed, with special attention given to physiology, technology, and marketing. The report also supplies a central register of workers and organizations engaged in food research.

Purpose of the report is to aid research directors in contacting experienced personnel and to help them avoid duplication of effort. A new feature in this latest book is a section on new and unsolved problems, listing 250 research items.



Since this Pfaudler Model RP-14 piston filler was installed by Hershey Chocolate Corporation, Hershey, Pa., two more machines have been ordered.

Why Hershey Chocolate Corporation added more Pfaudler fillers to production line

Any product with the popularity of Hershey Chocolate syrup must be handled speedily to keep up with demand. There is no more sensitive spot on the production line than the filling operation. Failure here could really mean trouble.

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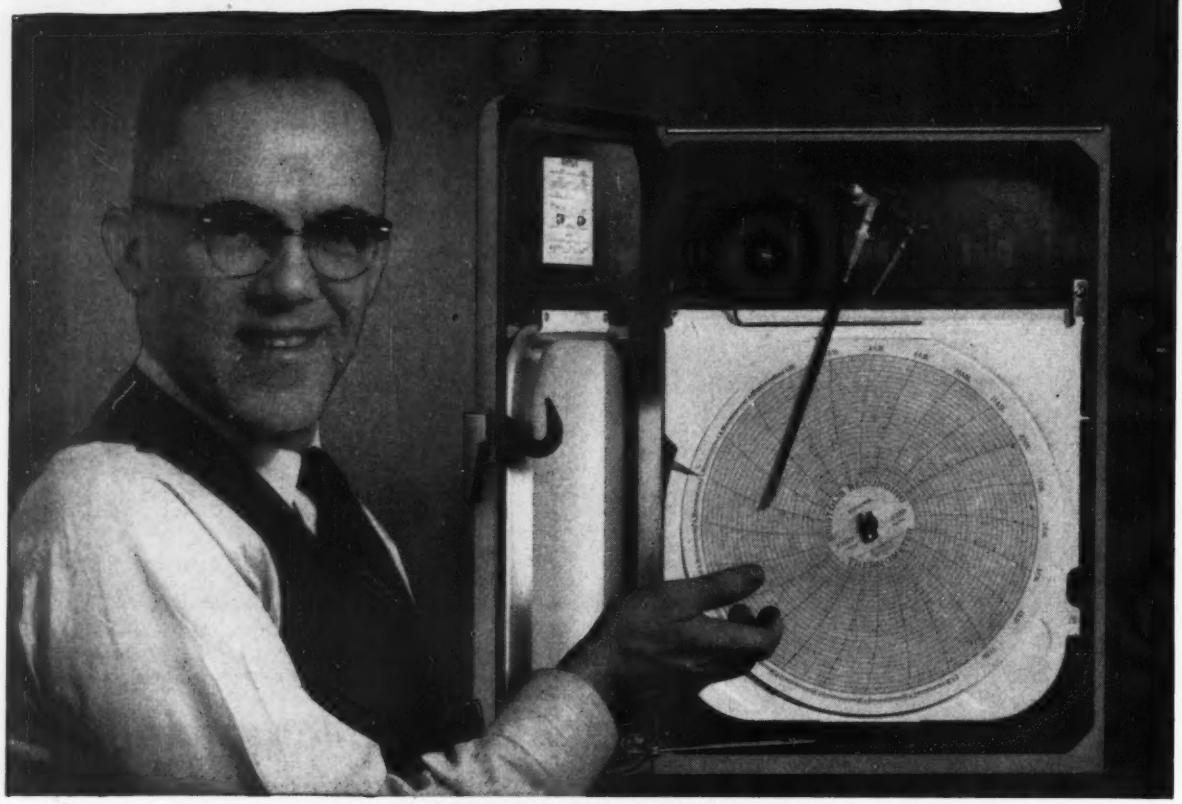

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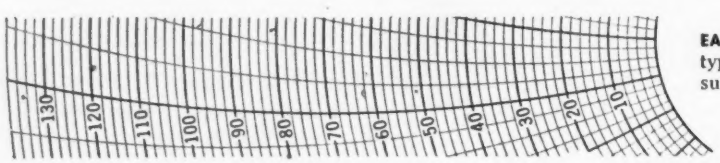

EASY-TO-READ. This full-size section of a typical Bristol Dual-filled Vapor Pressure Thermometer chart shows the extreme clarity and definition of its uniform linear scale.

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

New Additive Probe?

Odds are that another select committee will be named to investigate use of chemicals in foods, if Congress convenes in January with a GOP majority.

But this would not be a second Delany Committee, which critics termed a "headline group." Instead, policy here is seen as sympathetic hearings for all interested in food-additive legislation, followed by specific recommendations for legislation acceptable to all concerned.

Capitol Hill talk is that the body would be headed by Rep. A. L. Miller (R., Neb.), recently active in introducing additive and pesticide bills.

Cheaper Plum Container

A fiberboard container may soon replace the costly 4-basket plum crate. Cheaper to make and to pack, it is seen reducing marketing costs 25c. a box, states the California Grape & Tree Fruit League.

Although initial acceptability in market tests was low, recent modifications are said to make the new unit nearly the equal of the old crate.

Further work of the League will explore possibilities of a consumer-size package for fresh plums.

OK for "dbpc" Antioxidant

FDA approval now has been given for food use of "dbpc" (butylated hydroxytoluene), the antioxidant offered by Koppers Co., Inc., Pittsburgh.

The maker cites this agent's heat stability and compatibility. And cost is ranged as low as 1c. per 100 lb. of fat-food treated.

Details on the material are contained in technical bulletins (C-4-115 and C-4-197) newly issued by the company's chemical division.

Vs. Frozen Food Spoilage

A "task group" of the QM Food & Container Institute and the Research & development Associates of the F&CI has begun an investigation of (1) causes of frozen food spoilage, (2) conditions under which such spoilage arises, and (3) means of prevention.

Named committee chairman is John Beckett, technical director of Aseptic-Thermo Co. He invites participation of all persons in the field.

U. S. Metal Potentials Seen Bright For Tomorrow's Tin-Less Cans

Good news is that a number of metals available on this continent are seen ultimately emerging as suitable for the tin-free cans of tomorrow.

These materials—such as untinned steel, specially treated steel, aluminum, and steel coated with aluminum, zinc, and possibly nickel—were explored in a revealing paper, *Metal Cans of the Future*, presented at the recent Los Angeles meeting of the Institute of Food Technologists.

Prepared by R. H. Lueck, K. W. Brighton, and R. W. Pilcher, all of American Can Co.'s research and technical department, the paper laid accent on the fact that well over half of the world's tin production lies in the immediate path of the calculated communist aggression in Indo-China. Further, all our country's tin must be imported over long sea lanes.

▶ **To date, no one metal coating for steel has risen to fill the bill as a universal alternate for tin plate.**

Meanwhile, the government's stockpiling is providing short-term insurance against a tin shortage. However, importance of initiating a long-term program toward tinless cans, as exemplified at American Can Co., is stressed.

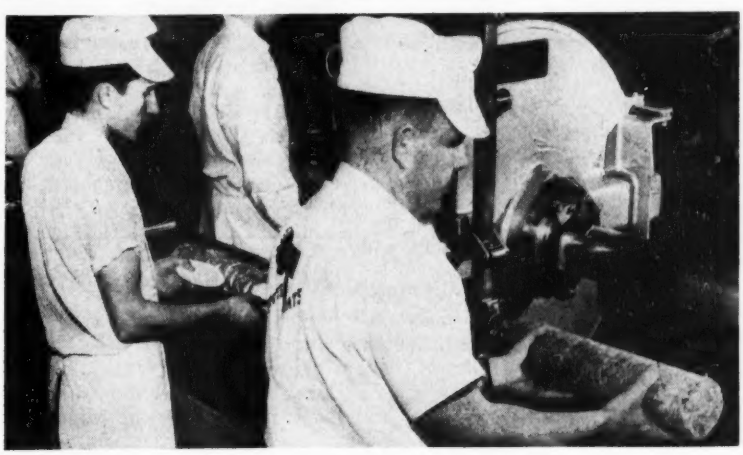
Tin plate, declared the researchers, is so unique that many believe the canning field "grew as it did around the properties of the steel-tin combination." Yet the implication cannot be avoided that more flexibility in concept now is essential in view of the pressing situation.

Untinned steel was the first metal indicated as a leading candidate for tin plate's toga—on the score of being the least expensive sheet metal and of having mechanical properties essentially the same as those of tin plate. But untinned steel must be enamelled on both sides to prevent corrosion.

Black plate and other sheet metals have been investigated, but each presents welding problems totally unlike any previously encountered. Even so, results have been encouraging enough to justify continued research.

Cements are newest can-making materials, and now are used extensively to bond sides seams of CMQ black plate quart motor oil cans. Cementing procedure is expected to be applicable to all potential alternates for tin plate.

Can making steel (CMS) is another alternative. It is believed that modifications of processing procedure after



From Beef "Cylinder" to Bacon-Wrapped Steaks

Using double-slicing technique, 6-oz. dinner steaks are mass-prepared at new $200,000 plant of Circle-T-Meats, Dallas. Employed is beef from which bone, gristle, and excess fat has been removed. After freezing and initial thin-slicing, it's shaped into long 4-in.dia. cylinders and again sliced (photo) to form ¾-in.-thick servings, each of which gets a bacon wrap. Also produced at new facility: Thin-sliced luncheon steaks, buttered beef steaks, ground-beef patties, and hamburger patties.

IFT Draws Top Turnout for Salient Talks, Exhibits

An outstanding total attendance of 1,624 had been chalked up by the time the doors finally closed July 1 on this year's annual meeting of the Institute of Food Technologists at Los Angeles.

Besides an exceptional program of more than 180 technical papers, plus exploration in such spheres as marketing, there was special spotlighting of food engineering's integration with food technology and science in a final-day symposium (see article page 80).

View Equipment & Supplies

Displayed in the exhibit hall were many of the latest machinery units, instruments, and food-plant and laboratory supplies. Highlights—

New pressure comminutor: Develops up to 75-lb. internal pressure on product or on cooling or heating medium (W. J. Fitzpatrick Co., Chicago).

Beta carotene: Manufactured form of natural coloring soon to be available to industry for margarine, butter, cheese, cakes, confections, and other foods (Hoffmann-LaRoche Co., Nutley, N. J.).

Hand refractometer: Measures sugar concentrates from 0 to 30%, reading to 0.1%. Automatically compensates for temperature variations from 50 to 100 deg. F. (American Optical Co., Southbridge, Mass.).

Small production mill: For mixing, blending, grinding, homogenizing, emulsifying, and the concurrent dispersion of non-corrosive, semi-corrosive, and corrosive materials. Capacities 4-25 gpm., depending on viscosity of product. Grind adjustments to 1/1,000 in. (Morehouse Industries, Los Angeles).

Xactronic meter: Liquid measure to indicate rate and quantity of flow, with recording and controling. Metering element comprises stainless tube with Teflon liner and attached electrodes, inclosed in magnetic field. Panel integrator has 5-digit reset register and 7-digit non-reset totalizer. (Bowser, Inc., Ft. Wayne, Ind.).

Institute Officers

IFT presidency for '55-'56 went to Dr. L. E. Clifcorn, director, Fundamental Research Div., Continental Can Co. He will receive the gavel next year from Philip K. Bates, Carnation Research Laboratories, Van Nuys, Calif., who is current leader.

Other officers are: Treasurer, Aksel G. Olsen, General Foods Corp., Hoboken, N. J.; Assistant Treasurer, Arthur N. Prater, Gentry Consolidated Grocers Corp., Los Angeles; and Executive Secretary, C. F. Lawrence, IFT, Chicago.

---

cold reduction can increase resistance to rust and underfilm corrosion, also improve enamel adhesion.

Chemically treated steel "is likely to be one of the first alternates for tin plate," and attempts are being made to reduce its cost. If ways can be found to solder it, this metal should be applicable to ends of cans for low-acid foods and for bodies.

Aluminum, which makes up about 7% of the earth's crust as compared with 5.06% iron and 0.0001% tin, should provide an alternate plate. Its properties have both attractive and unattractive features to can makers—lightness being a benefit, but not softness.

Hot dipping, cladding, electroplating, spraying, and vapor disposition were techniques mentioned in applying aluminum coatings to steel. And several methods are close to the pilot plant stage. Goal is to apply enough aluminum to provide the same rust resistance as does tin when used at ¼-lb. per base box.

A major advantage of aluminum coating on steel is that mechanical properties of such plate essentially will be the same as for tin plate.

Zinc coated steel and **nickel plated steel** may be applicable for only certain classes of products for which other alternatives are not suitable.

More Algae Piloting

Algae food will be further investigated through operation of new U-shaped-trough pilot plant atop a U. of C. building at Los Angeles. One-celled plant, chlorella—thus grown by action of sunshine, water, and nutrients—are rich in proteins and fats. First use is as cattle-feed.

Badge for Benson

Dr. Walter V. Price (right) president of the American Dairy Science Assn., pins a membership badge on Secretary of Agriculture Ezra Benson. Looking on is Milton Eisenhower, president of Pennsylvania State University. Event was annual ADSA meeting at Penn State, at which the Secretary was featured speaker.

Another Brewer Adds Pop

Continuing the march of brewers into the canned pop field, Weber-Waukesha Brewing Co., Waukesha, Wis., has acquired the Mission Beverage franchise for the Midwest.

Taking a 10-yr. lease on the former Van Merritt Brewery building, Burlington, Wis., it has installed a 12,000-case-per-day can filling line and plans to put in two more.

New plant covers 70,000 sq. ft., with approximately one-half of area used for production, while remainder is devoted to empty can storage.

Freeze-and-Thaw Process For Liquid Concentrates

A system of fractionized freezing and thawing now has been advanced by Dr. Adolfo Romeo, of Italy, for concentrating the juices of citrus fruits, musts, milk, and other aqueous solutions (McGraw-Hill World News).

He cites his newly-patented process as (1) maintaining composition of the liquids, (2) rapidly eliminating great volumes of water, and (3) giving products organically perfect while preserving fresh taste and original aroma.

In the process, the materials are brought to a temperature near zero, which prevents fermentation and also allows the short thermic fall for freezing. Liquid then is steadily cooled and poured into a machine that transforms it into snow.

This is subjected to aspiration at reduced pressure, compressed in a special machine, then ejected as frozen water (pure snow). The concentrated liquid returns to the cycle in the same or other machines to undergo successive freezings and thawings in order to obtain higher concentrations.

Turkey Off-Flavor Pinned

Emphasis that off-flavors in the cooked meat of young turkeys is to be laid to excessive use of fish products in the feed for the birds comes from Food Specialist Mary Swickard, USDA, Beltsville, Md.,

Suspicions of antibiotics on the flavor score are discounted.

Advice to growers is to limit fish meal to 5% and feeding oil to 0.15% of the starting diet.

Levulose From Ti

Extraction of levulose from the ti plant is being checked at Grove Farm Co., Kauai, Hawaii.

Following experiments by Dr. H. L. Lyon, director emeritus, Hawaiian Sugar Planters Assn.'s experiment station, the company has planted 12 acres in ti and is assembling a pilot plant for production of levulose syrup and crystals. A hardy plant, ti grows wild in the islands.

Ascorbic Okay in Pickle

Ascorbic acid or sodium ascorbate may be added to curing pickle for beef briskets and other beef cuts, states USDA's Meat Inspection Branch Memorandum No. 205.

The pickle should contain not more than 7½ oz. of the agents to 100 gal. of pickle. Marking and labeling to show addition of these materials is not required.

Hors d'Oeuvres

▶ In Copenhagen, live trout were anesthetized, shock-frozen at 40 below zero, stored for four months, defrosted, and placed in water. You guessed it. The fish were alive and swimming.

▶ But the English went the Danes one better. British medical researchers froze warm-blooded animals—hamsters—to 23 below, then thawed them out and had them walking within two hours.

▶ Now, we like our frozen fish and meat to be fresh. But not so fresh that it flops off the plate or walks across the table.

▶ To make ripe bananas keep longer by causing them to breathe less, a harmless, odorless wax has been developed to coat them. Can you imagine anything more slippery than a waxed banana peel?

▶ Thailand is seining from the sea some 5,000 tons of minute plankton a year for use as a food and food ingredient. High in protein and vitamin B_{12}, the stuff looks and smells much like anchovy paste. As for taste. Well, you wouldn't write home for any.

▶ Englishmen hold the world's candy-eating championship, with a per capita consumption of 7.5 oz. a week, NCA reports. New Zealanders come next with 5.9 oz., and the Aussies and Americans are tied for third with 5 oz. The British really do have a keen appreciation for the finer things in life.

▶ Between Decoration Day and Labor Day this year, people in the U. S. will eat 2,624,640,000 hot dogs, AMI estimates. And they'll smear about 250,000 miles of mustard on 'em.

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Nicholson Steam Traps Cut Heat-Up Time 48%

A large processor recently reduced the heating cycles of cookers from 105 min. to 50-60 min., by substituting Nicholson thermostatic steam traps for a mechanical type. This effected a gratifying production increase of 37%. Reasons for Nicholson's faster heat transfer: operate on low temperature differential; 2 to 6 times average drainage capacity; maximum air venting. Send for....

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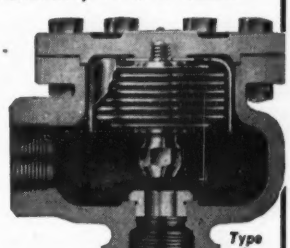

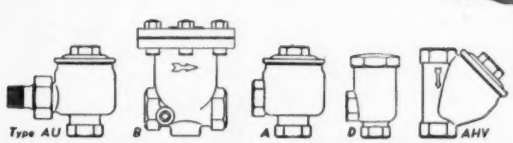

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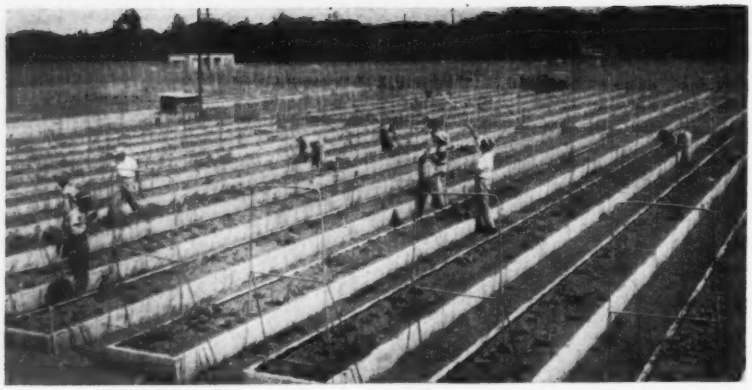


Soilless "Food Factory" Produces 30 Tons of Tomatoes to Acre

Major tests of hydroponic "factory type" farming are underway in Puerto Rico, with two advanced soilless-growing, chemical-nutriculture units at work. Seen is layout of Cy Robbins, Johns Hopkins U. graduate plant physiologist. More than a year old and already commercially successful, it has produced a bumper crop of tomatoes, 30 tons to the acre, or some five times more than can be raised on same amount of soil. Experiments also are proceeding on such other fruits and vegetables as strawberries, cantaloupes, and peppers. The growing is in concrete troughs holding gravel beds, wherein plants get all necessary mineral nutrients through a flow of controlled chemical solution run in at regular "feeding" periods. From frames over beds, lines are suspended to support plants. Second unit is newly-launched Hydroponics, Inc., directed by Carrol L. Klotzbach. Designer and builder of hydroponic equipment, he formerly conducted operations at the large U. S. Army soilless farm in Japan. (Wide World photo)

Cane Hauling by 'Copter?

Possibility of toting sugar cane by helicopters now is being considered by Lihue Plantation Co. in Hawaii. A 'copter capable of lifting 3 to 5 tons would be required.

Lihue is one of last plantations using railway transport. Conversion to giant trucks would necessitate a road network consuming many acres of land. But airlifting would preclude such requirement, affording more land for cane-growing.

Moore Heads ADSA; Award to Elliker

New president of the American Dairy Science Assn. is Dr. L. A. Moore, head of the nutrition and physiology section, dairy husbandry research branch, USDA, Beltsville, Md. He succeeds Dr. W. V. Price, University of Wisconsin.

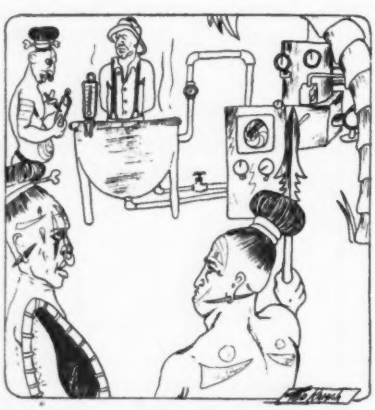
The election was at the recent meeting of ADSA at Penn State University. Named vice-president and secretary, respectively, were two members of Ohio State U.'s dairy technology department., Dr. I. Gould, chairman, and Prof. T. Harman.

Pertinent in the food processing field was presentation of The Borden Award in Dairy Manufacturing to Dr. Paul R. Elliker, professor of dairy bacteriology, Oregon State College, in recognition of his outstanding work for the dairy industry. This honor carries $1,000 and a gold medal.

ADSA also elected two directors for 3-yr. terms: Dr. G. Hyatt, Jr., head, dairy extension staff, North Carolina State College, and Dr. R. Hodgson, chief, dairy husbandry research, USDA. Beltsville, Md.

Student Wit

Special cartoon handbills were distributed by students to draw attention to their food engineering booth in the recent "Technorama" exhibit at Illinois Institute of Technology, Chicago. Here is one of the cartoons:



"Things have changed since Pogo returned with his degree in Food Engineering from IIT."

Research Is Targeted By Soft Drink Group

To direct research into channels in which there is need for specific data, American Bottlers of Carbonated Beverages now has added a second division to its Chesterman Award program.

The new Division II will provide up to $2,500 annually in cash grants, or fellowships, to finance research of types determined by the Awards Committee.

Meantime, Division I will continue to offer $1,000 in cash for "the most outstanding contribution" to the beverage industry.

Briefly . . .

• MELLORINE BILL put before the Louisiana House of Representatives would have banned use of vegetable oils in place of frozen-dessert butterfats. But it failed by three votes to win the required majority of 51.

• **RED SALMON packers of Alaska's Bristol Bay area have consolidated operations in interests of mutual economy in the face of a second lean-run season. Pooling efforts are Alaska Packers Assn. (California Packing Corp. subsidiary), Columbia River Packers, Libby McNeill & Libby, Nakat Packing Corp. (A&P subsidiary), Pacific American Fisheries, Inc., Peninsula Packing Co., and Red Salmon Packing Co.**

• FOOD RATIONING'S end in Britain was marked by a "tearing up of the books." Symbolically, freedom day was July 4. Meat was the last category to be lifted, ending the era of restrictions dating back to the start of World War II.

• **PAPER MILK CARTONS are seen carrying nearly 50% of the nation's beverage milk this year, packing of a record 10.5 billion of the containers being expected. This is the 20th anniversary of the one-trip carton.**

• BEST MANAGED COMPANY in the field of food and kindred products is The Kellogg Co., according to judgment reports of the latest competition of the American Institute of Management. Criteria: Economic function, corporate structure, health of earnings growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor, and executive evaluation.

• **NUTRITION STUDY has been promoted by award of Buitoni Foods Corp. of government bonds to 15 students of 13 colleges in the New York area.**

• AID-TO-EDUCATION undergraduate scholarships, of $2,000 each, have been established at six universities and colleges by National Starch Products, Inc. Aim is encouragement of technical training.

Goods made enroute . . .

. . . go fresh to housewives via—

Bakery on Wheels

A midget "rolling bakery" is the new merchandising idea of McGlynn Bakeries, Minneapolis. It turns out sweet items as it travels–for "right out of the oven" sales at the consumer's doorstep.

Fitted in the compact truck-bakery are an oven, proof box, retard refrigerator, doughnut fryer, and numerous accessories. Oven and fryer are operated on bottled gas; other equipment on current from a 3,500w. gasoline-engine-driven generator.

A team of two–driver-salesman and a baker–man the truck.

3/8th Bushel Approved

A new three-eighths bushel basket size for fruits and vegetables has been approved by Congress, amending the Standard Container Act of 1928.

Peach and apple growers had emphasized need of the new container due to fruit being shipped riper than before.

Opposing the move was the National Conference on Weights & Measures, which contended that closeness of the new size to the half-bushel would tend to deceive consumers.

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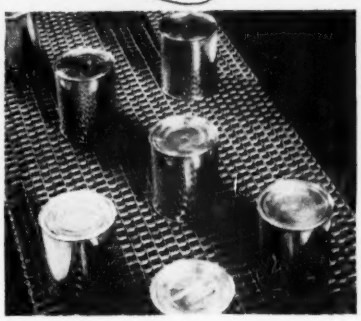
. . . FOR FOODS IN PROCESS!



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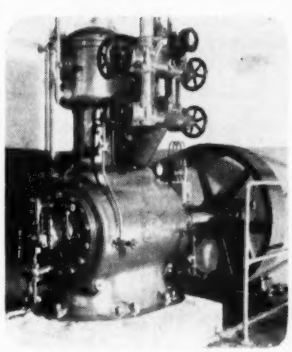

9 x 9 Compressor at Sodus

The Sodus (Michigan) Fruit Exchange installed three large Frick compressors in 1948—has since added another big booster and 9 by 9 machine for the freezer storage illustrated. Installation by Hayes Brothers, Inc., Frick Distributors at Indianapolis and South Bend.

Whatever your cooling requirements, there's a Frick system designed to satisfy them. You name the temperature and humidity you want, and we'll do the rest! Send for literature and estimates.

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WAYNESBORO, PENNA. U.S.A.

Here we go--doing two things advertising experts frown on!

We thought we'd never run a picture of our plants in an ad.

Not us. Generally, we're too busy telling food processors what wonderful things Huron MSG and HVP can do for *their* products. But here it is — factory, chimneys and all.

Why? Because, as the oldest producer of MSG in this country, we felt it was high time to show our users we have a big modern plant, capable of meeting their needs for protein derivatives.

As a matter of fact, we started the whole thing in this country. We worked out the means of making glutamates from wholesome, nutritious wheat, the richest natural source of glutamic acid. We've kept on quietly making our taste-improving products; we've grown as the food industries have prospered.

Second, we never thought we'd run pictures of Huron's "founding fathers". Yet here we go — meet Huron's A. Jarvis Patten.

Mr. Patten is the distinguished protein chemist who first worked out the highly complex procedure for making MSG on a commercial scale in this country. If there's ever a Hall of Fame for the food industries, we think you'll agree Mr. Patten deserves a niche there.

A third thing, though, we can't *show* here. That's Huron's wealth of technical experience. Through the years we've built up a technical service group second to none. Having longer experience than any other manufacturer of MSG, we've amassed a vast fund of technical data on its use. The answers to most of the questions processors want to know are in our files right now.

For MSG that's consistently top-quality, made by the American pioneers in protein derivatives, for practical, usable technical information on how you can improve your products with them, look first to Huron. Huron Milling Company, 9 Park Place, New York 7, N.Y.

Huron MSG

PURE MONOSODIUM GLUTAMATE 99+%

Made by the pioneers in protein derivatives

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Milking Rig Fits On Tractor

Swedish dairymen now field-milk by machine, using this transport box and vacuum attachment that fits on back of tractor. Designed by Baeckefors Bruks AB, of Baeckefors, box holds two milk cans, two milking units, and filters. Milking assembly, supplied by Alfa-Laval Separator Corp., Stockholm, runs on vacuum from tractor intake manifold.—McGraw-Hill World News.

DISA's "Who's Eligible"

A small booklet clearly indicating who may attend the 19th Dairy Industries Exposition, and under what circumstances, has been prepared by the credentials committee, Dairy Industries Supply Assn. The exposition is scheduled for Atlantic City, N. J., Oct. 25-30.

Among those who will be admitted free, says the booklet, are: Dairy processors; educators and students; and federal, state, county, and city officials concerned with dairy products. The general public will not be admitted.

USDA & FDA Standards

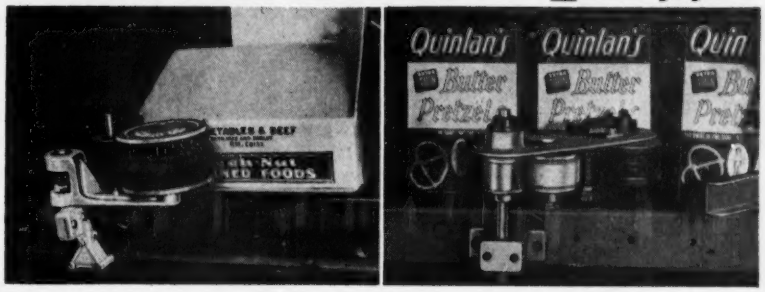
Recent actions by the USDA's Agricultural Marketing Service (food standards), FDA and the Agricultural Research Service, along with *Federal Register* citations, include the following:

Radishes, standards revised, June 15 *F. R.*, p. 3487.

Carrots, fresh and topped, revised, June 16 *F. R.*, p. 3499, 3502; correction, June 22 *F. R.*, p. 3792; bunched and with short trimmed tops, proposed revisions, July 2 *F. R.*, p. 4033, 4037.

Castor oil, removal of restrictions on use and inventory contained in

Low-cost marking attachment pays for itself in weeks...saves thousands of $ every year



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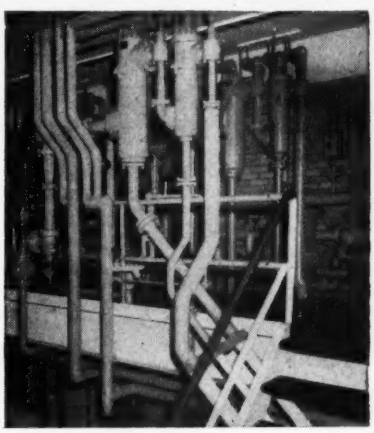

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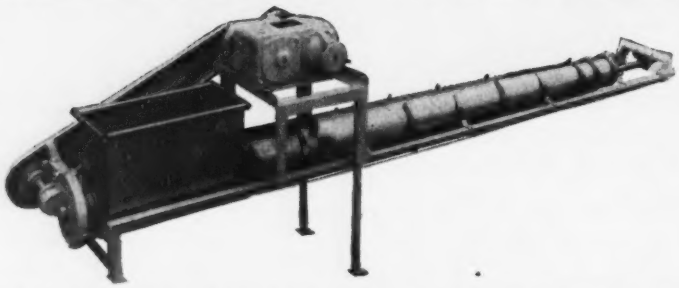

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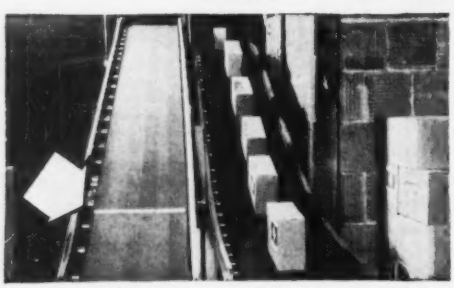

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JUST A HAMMER TO APPLY IT

Defense Food Order No. 1, June 18 F. R., p. 3625.

Tea, amendments to regulations set up by FDA under Tea Importation Act, June 19, F. R., p. 3647; correction June 23 F. R., p. 3810.

Cottonseed, for crushing, effective date now June 1, 1955, June 23 F. R., p. 3807.

Cheddar cheese, revision to allow packaging in aluminum foil, June 23 F. R., p. 3809.

Frozen green and wax beans, correction June 23 F. R., p. 3809, to new standard in June 4 F. R., p. 3293.

Carrots, canned, proposed revision on recommended minimum drained weight, June 25 F. R., p. 3873.

Meat, food products, use of preservatives, revisions of meat inspection regulations, June 25 F. R., p. 3859.

Beets, canned, proposed revision on recommended minimum drained weight, sizes of beets in whole beets, June 30 F. R., p. 3968.

Dry buttermilk, June 30 F. R., p. 3955.

Low salt foods, FDA labeling requirements, July 1 F. R., p. 3999; correction July 7 F. R., p. 4108.

Citrus juices, proposed revisions, July 3 F. R., p. 4081, 4083, 4085.

Garlic, imported, revised fumigation regulation, July 8 F. R., p. 4126.

Schedule of Events

August

17–19—Western Packaging & Materials Handling Exposition; Civic Auditorium, San Francisco.
17–19—National Assn. of Sanitarians; Jung Hotel, New Orleans.
29–S1—International Apple Assn.; Yakima, Wash.
30–S1—American Soybean Assn; Hotel Peabody, Memphis, Tenn.

September

6–8—Assn. of Cereal Research, bakery convention; Detmold, Western Germany.
12–15—Confectionery Caravan Show; Palmer-House, Chicago.
12–15—Lake Michigan States Bakers, Fall conference; French Lick Springs Hotel, French Lick, Ind.
15–21—Instrument Society of America, 1st International Exposition & Congress on automatic control in manufacturing; Commercial Museum, Philadelphia.
17–19—National Poultry, Butter & Egg Assn.; Chicago.
19–22—National Frozen Food Locker Institute; Hotel Jefferson, St. Louis.
23–26—Packaging Machinery Manufacturers Institute; Grove Park Inn, Asheville, N. C.
26–28—Southern Bakers Assn. Production Conference; Hotel Biltmore, Atlanta, Ga.
26–30—Master Brewers Assn. of America, annual convention; Waldorf-Astoria Hotel, New York City.
27–29—American Management Assn., Fall personnel conference; Hotel Astor, N. Y. C.
28–30—National Industrial Packaging & Materials Handling Exposition (Coliseum); and annual convention of Society of Industrial Packaging & Material Handling Engineers; Chicago.
30–O2—Southwestern Frozen Food Assn., New Orleans, La.

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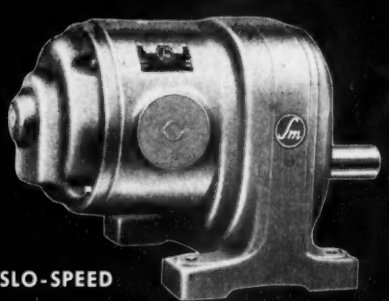
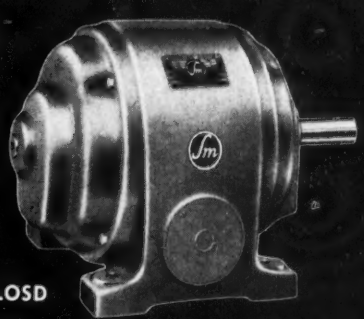


SLO-SPEED

CONSTANT NORMAL SPEED



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Frozen Confection Coating Consisting of Oil-In-Water Emulsion, Edible Vegetable Oil Melting at 75-115 F., Ester Emulsifier—*P. J. Carter, West Chester, Pa. to Atlas Powder Co., Wilmington, Del. No. 2,674,534. April 6, 1954.*

Composition for Controlling Decay in Packed Citric Fruits Comprising Solution of Alkali Metal Salt of Fungicidal Phenol and Hexamethylene Tetramine—*E. F. Hopkins, Lake Alfred and K. W. Lanks, Winter Haven, Fla. No. 2,674,537. April 6, 1954.*

Sheeted Pastry Shortening Comprising Plurality of Thin Rectangular Sections on Flexible Sheet Within Rigid Container—*M. J. Thomas, Chicago and J. J. Prohaska, La Grange, Ill. to Swift & Co. No. 2,676,890. April 27, '54.*

Quick-Cooking Alimentary Paste Made With 60% Wheat Flour, 5-10% Leavening, Proofed at 45-100% Humidity 50-105 F. to 50% Volume Increase, Kneaded, Shaped, Steamed, Dried—*C. D. Shiah, New York City. No. 2,677,613. May 4, 1954.*

Smoked Yeast by Forcing Smoke Through Growth Medium, Recovering Yeast—*C. Freshel, New York City. No. 2,677,614. May 4, 1954.*

Preformed Frozen Confection With Embedded Stick Handle and Block of Cake to Absorb Drip —*R. H. Sueskind, New York City. No. 2,677,615. May 4, 1954.*

Mushroom Spawn Comprising Charcoal Base With Cereal-and-Water Coating—*E. B. Speakman, Avondale, Pa. No. 2,677,917. May 11, 1954.*

Canned Fish Having Incorporated Amino Polyacetic Acid Compound Sufficient to Suppress Crystallization of Struvite—*R. L. Swaine, Brighton, Mass. to Gorton-Pew Fisheries Co. Ltd., Gloucester. No. 2,680,076. June 1, 1954.*

Variegated Ice Cream by Forming Tubular Mass With Core of Flavoring Material Broken Into Plurality of Portions and Distributed Within Ice Cream—*G. G. Balch, Pittsburgh, Pa. No. 2,680,414. June 8, 1954.*

Proteolytic Papaya Concentrate by Peptonizing Fruit Pulp, Hydrolyzing Proteins, Boiling to Form Syrup, Adding Papain—*H. Moulton, Norwalk, Conn. No. 2,680,688. June 8, 1954.*

Liquid Pepper Composition by Solubilizing Piperin of Pepper Oleoresin in Anhydrous Lactic Acid—*F. R. Schumm, Jersey City, N. J. and C. Johnstone, Hicksville, N. Y. to Dodge & Olcott, Inc., New York City. No. 2,680,690. June 8, 1954.*

Rye Bread Mix Containing Mono- and Dibasic Sodium Phosphate, Yeast, Rye Flour — *J. J. Janis, Willoughby, Ohio. No. 2,681,278. June 15, 1954.*

PROCESSES

Making Frozen Comestibles by Forming and Congealing Cup-Shaped Layer Inside Mold, Forming and Freezing Second Cup of Different Material, Inserting Core, Covering With Pre-Congealed Plate, Congealing Core—*P. J. DePasquale, Hartford, Conn. No. 2,674,960. April 13, 1954.*

Refining Vegetable and Animal Oils Continuously by Proportioning Strong Lye Into Mildly Turbulent Flowing Oil, Centrifuging, Repeating Above Operation — *L. A. Afzelius, Bromma, and H. O. Lindgren, Smedslatten, Sweden to Aktiebologet Separator, Stockholm, Sweden. No. 2,678,936. May 18, 1954.*

Pasteurizing Dried Uncured Fish Meal by Forcing Air Through Mass at 140-165 F. for 15-90 min. —*P. A. Shaw, Anaheim, Calif. No. 2,679,457. May 25, 1954.*

Impurities Removed From Raw Sugar Juices by Liming, Carbonating, Adding Solution of Acid, Ester and Gum — *S. Moore, Woodland, Calif. to Spreckels Sugar Co., San Francisco. No. 2,679,464. May 25, 1954.*

Partially Dehydrating Flour by Rapidly Passing Through Dryer at 215-225 F., Quick Cooling, Passing Through Second Dryer at 265-335 F., Quick Cooling—*E. G. Gustavson, Clarendon Hills, Ill. to Quaker Oats Co., Chicago. No. 2,680,303. June 8, 1954.*

Transporting Live Fish by Partially Immersing in Water, Confining Against Undue Movement, Surrounding With Moist Atmosphere—*R. M. Brown, Albuquerque, N. M. No. 2,680,424. June 8, 1954.*

Making Baker's Yeast by Subjecting to Hindered Fermentation Through Temperature Range 54-70 F., Accelerating Fermentation to Obtain High Yield — *K. Schneider, Mannheim to Backhefe G.m.b.H., Frankfurt am Main, Germany. No. 2,680,689. June 8, 1954.*

Transferring Slabs and Strips of Fatty Material by Combination of Pressure Pump, Open Hopper,

Discharge Pump, and Conveyor Means Extending Between Stations—*H. H. Noble to E. Kahn's Sons Co., Cincinnati, Ohio. No. 2,681,270. June 15, 1954.*

Preparing Sausage by Applying Vacuum to Remove Air, Comminuting in Nitrogen—*E. C. Sloan and M. I. Wegner, Madison, Wis., to Oscar Mayer & Co., Chicago. No. 2,681,279. June 15, 1954.*

Treating Raw Shell Eggs to Improve Whipping and Keeping Qualities When Dried by Immersing in Fermenting Microorganism-Containing Liquid, Removing, Holding 24 hr. Shelling, Subjecting to Incubating Temperatures to Complete Fermentation — *J. E. Sherman and L. B. Jensen to Swift & Co., Chicago. No. 2,681,280. June 15, 1954.*

Stabilizing Fatty Compositions With Glycine and Phosphoric Acid Dissolved in Sorbitan Fatty Acid Ether—*N. H. Kuhrt to Eastman Kodak Co., Rochester, N. Y. No. 2,681,281. June 15, 1954.*

EQUIPMENT

Apparatus for Overlapping Extended Flange Type Cans For Non-Spill Continuous-Line Filling —*W. McK, Martin, San Mateo, to James Dole Engineering Co., San Francisco, Calif. No. 2,672,270. March 16, 1954.*

Dough Former Comprising Two Power-Driven Roller Shafts Disposed Over Conveyor for Engaging and Rolling Dough Into Helical Forms—*F. A. and J. F. Anetsberger. Chicago to Anetsberger Bros., Inc., Northbrook, Ill. No. 2,674, 209. April 6, 1954.*

Cake Icing Machine Consisting of Pressure Chamber and Two Nozzle-End Extension Tubes Between Which Cake is Rotated—*W. A. King, Forty Fort, Pa. No. 2,674,233. April 6, 1954.*

Liquid Mold Filler Comprising Supply Line With Electrically Controlled Outlet Valve, Rocking Feed Conveyor—*L. Plusquellic to Riech-McJunkin Dairy Co., Pittsburgh. No. 2,674,397. April 6, 1954.*

Liquid Sterilizing Apparatus Comprising Two Parallel Disks in Close Proximity, One Having Spiral Groove Containing Ultraviolet Light Source Covered With Transparent Sheet, Means for Introducing Liquid, and Rotating to Force Liquid Over Sheet —*E. Nicholson, Dunedin, Fla. No. 2,674,697. April 6, 1954.*

Gassing Apparatus Consisting of Chamber With Top Wall a Gas-Permeable Conveyor, Sloping Member on Which Material Moves From Conveyor to Chamber Floor, Sealable Material Outlet—*K. J. Sylvest, Copenhagen, Denmark, to F. L. Smidth & Co., New York City. No. 2,674,810. April 13, 1954.*

Pastry Tube Making and Filling Machine Comprising Plurality of Forming Molds, Removing Means, Filling Tube, Discharge Mechanism—*H. Puls, New York City. No. 2,674,958. April 13, 1954.*

Continuous Slicing Machine Consisting of Plurality of Side Feed Holding Tubes, With Retractable Pushers, Rotary Cutter at end of Tube—*A. E. Cranston, Jr. Milwaukie, Ore. No. 2,674,959. April 13, 1954.*

Peach and Apricot Pitter Consisting of Plurality of Fruit-Carrying Elements, Each Comprising Pair of Side Members With Cutout for Receiving Seed, Inwardly Projecting Tongue and Inclined Flesh Severing Wire—*F. W. Bauer, Dundee, Ill. No. 2,675,039. April 13, 1954.*

Sausage Casing Perforator With Channeled Wheel Having Spurs at Center of Channel and Parallel Side Flanges for Centering Sausage as Wheel is Manually Rolled Over it—*O. Bolton, Denver, Colo. No. 2,675,579. April 20, 1954.*

Sausage Linking Apparatus Comprising Endless Conveyor With Fixed and Movable Cross Bars Having Spaced Fingers to Crimp and Hold Casings in Form of Links, Latching and Unlatching Means—*A. W. Eber, Pittsburgh, Pa. No. 2,675,753. April 20, 1954.*

Sorting Device Employing Rollers to Align Articles During Forward Motion Along Conveyor Comprising Plurality of Photoelectrically Operated Gates for Directing Articles Into Ducts According to Size—*J. B. Powers, Davis, Calif. to U. of Calif., Berkeley. No. 2,675,917. April 20, 1954.*

Machine for Removing Lids From Pullman Bread Pans Uses One Conveyor to Move Pans in Centered Position as Leading End of Second Conveyor Above and at Angle Engages and Lifts Lids—*E. V. Poolen, Cicero, Ill. to W. E. Long Co. No. 2,675,953. April 20, 1954.*

Device for Puncturing Egg Shell Comprising Circular Support, Small Cutting Point on Free-Running Shaft—*W. L. Wood, Sea Cliff, N. Y. No. 2,676,631. April 27, 1954.*

Steam Peeling Apparatus Consisting of Two-Level Tunnel, Lower Section With Product Conveying Means, Upper With Live Steam Inlet and Radiator for Further Heating Steam as it Moves Through Plurality of Openings to Lower Section—*B. A. Hook and R. B. Nawman to Benner-Naw-*

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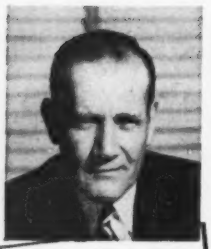

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HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

man, Inc., Oakland, Calif. No. 2,676,632. April 27, 1954.

Bread Pan Emptying Machine Comprising Feed Conveyor, Invester, Elevator, Pan Turner, Discharge Conveyor—I. M. Archer to Campbell Taggart Research Corp., Dallas. No. 2,676,718. April 27, 1954.

Vegetable Slicing Machine Comprising V-Shaped Trough, Transversely Disposed Knife Holder, Slidably Mounted Ram Conforming to and Contacting Trough Walls With Plurality of Pusher Bars Adapted to Spaces Between Knives—C. A. and C. N. Brown, Wabash, Ind. No. 2,677,403. May 4, 1954.

Refrigerated Air Conditioned Meat Trailer Consisting of Insulated Body, Refrigerating Unit, Special Duct and Air Distribution Manifolds in Side Walls—G. N. Warnick, Calgary, Alberta, Can. No. 2,677,941. May 11, 1954.

Frozen Confection Machine Comprising Insulated Cabinet, Refrigerating Systems, Inlet and Outlet Apertures, Endless Chain Conveyor With Carrier Plate Disposed Slidably on Refrigerant Pipes.—C. K. Nelson, San Marino, and C. R. Behling, Pasadena, Calif. to Eskimo Pie Corp. Bloomfield, N. J. No. 2,677,943. May 11, 1954.

Deep Fryer Comprising Plurality of Transverse Parallel Heating Tubes Extending Across Top Portion of Open Vessel With Baffles to Provide Maximum Heating and Circulation of Oil—R. T. Keating, Chicago. No. 2,678,039. May 11, 1954.

PACKAGING

Food Package With Portion-Sealing Barriers for Portion Removal —C. W. Vogt, Norwalk, Conn. No. 2,671,731. March 9, 1954.

Machine for Filling Cans With Weighed Charges Employing Liquid Containing Balance Beam on End of Which is Weighing Bucket, Hinged-Door Filling Nozzle, Adjustable Counter Weight—S. Birkland, San Francisco to American Can Co., New York City. No. 2,675,203. April 13, 1954.

Flexible Casing Filler Comprising Upstanding Plate, Moving Slide With Jaws to Grip Casing End—M. Friedman, Great Neck, N. Y. No. 2,677,487. May 4, 1954.

Bag Closing and Sealing Machine Comprising Conveying, Adhesive Applying, Folding Means, Perpendicularly Operating Ram That Moves Bag to Second Conveying, Adhesive Applying, Folding Mechanism—L. Coakley, Pepperell, to Bemis Bros. Bag Co., East Pepperell, Mass. No. 2,677,924. May 11, 1954.

Prepackaging Scale Consisting of Longitudinal Row of Translucent Unit Price Indicia Aligned With Corresponding Row of Weight Indicia Visible Through Elongated Sight Opening and Illuminating Means Within Main Housing—C. O. Jaeger, Milwaukee. No. 2,678,020. May 11, 1954.

Volumetric Filler, With Continuously Rotated Check-Weighing Means, Including Weighing Receptacle, Mechanism for Releasing Weighed Load Simultaneously With Filling Associated Receptacle—S. R. Howard, Milton, to Pneumatic Scale Corp., Ltd., Quincy, Mass. No. 2,678,185. May 11, 1954.

Single Piece Frozen Confection Container Comprising Sides, Tuck Member, Ends, Triangular Locking and Spacing Flaps, Bottom Closure Member Shorter Than End Member Thus Forming Two Pockets.—W. H. Madden, Huntington, N. Y. No. 2,680,557. June 6, 1954.

Flat Top Can Carrier Cut From Single Blank, Foldable Into Hood for Filling Through Bottom, Closed by Securing Overlapping Bottom Flaps—G. C. Currie to Dacam Corp., Charlotte, N. C. No. 2,680,556. June 6, 1954.

Ice Cream Package With Partitions Arranged to Form Plurality of Rectangular Chambers—E. Le Roy Turner, Atlanta to R. E. Beckwith, Worthington, Ohio. No. 2,681,144. June 15, 1954.

Leavened Dough Package With Inner Wrapper Having Opposed Edges Forming Fold That Allows Expansion While Maintaining Dough Within—C. B. Graves, Webster Groves, Mo. to Sefton Fibre Can Co., St. Louis. No. 2,681,284. June 15, 1954.

Candy Wrapping Machine Consisting of Two Wheels, one With Circumferentially Spaced Pockets, Injecting Means, Ejecting Arm, Other With Plurality of Pockets, Heat-Sealing Means, Two Angularly Spaced Sections Comprising, Respectively, a Piercing Pin and Stick Insertion Mechanism—W. H. Sargent to Ideal Wrapping Machine Co., Middletown, N. Y. No. 2,681,624. June 22, 1954.

Bottle Cap Liner of Resilient Plastic Having Resilient Deformable Annular Rib Extending Upward With Annular Groove on Upper Face, and Annular Rim—L. C. Miller to Formold Plastics, Inc., Chicago. No. 2,681,742. June 22, 1954.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

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It was Friday, 8:01 A.M. when the call came in. A cannery was in trouble. They had "burned-on" deposits that called for quick action. This looked like a case for DILAC . . . the super-efficient mild-acid cleaner.

I hurried over. Sure enough, the pasteurizer, cooker and evaporator needed DILAC's gentle treatment. I could recommend DILAC because I knew it was safe . . . completely safe.

DILAC did the job . . . but I wasn't through. The cannery needed help in heavy-duty cleaning. It was a hard-water area . . . that meant DIVO-BRITE . . . the cleaner that's safe and easy to use in circulation or soak operations. For steam guns and hand-cleaning, I would have suggested DIVOLUXE . . . with the built-in water softener and extra reserve strength to maintain longer cleaning life. I know that DIVOLUXE will not discolor soft metals.

I was about to leave. Suddenly, I realized I hadn't told the foreman about RELION . . . the special Diversey product for peeling fruits and vegetables. I hadn't mentioned that RELION has outstanding free-rinsing properties which result in less carry-over and reduced operating costs.

This oversight was taken care of. I reminded the purchasing agent that Diversey has products tailored to do specific jobs in food plants . . . that no one equals Diversey's record of experience in providing the right cleaner or combination of cleaners for each job. And, the P. A. was convinced . . . "for a fast clean-up of a sanitary problem," he said, "it pays to call a D-MAN!"

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Men & Companies

Mary F. Hughes (left) and **Alan D. Hinrichs** are new appointments of Refined Syrups & Sugars, Inc., of Yonkers, N. Y. Mr. Hinrichs is new plant engineer in charge of maintenance of the company plant, installation of new processes and operation of liquid sugar truck fleet. Miss Hughes, who recently helped perfect Dextran, blood plasma substitute, is new director of research.

Industry

Atlantic Sugar Refineries Ltd. are planning a new fall addition in St. John, N. B., to cost between $2.5 and $3 million.

Buring Packing Co. of Memphis has purchased Longino & Collins, Inc., of New Orleans, for a sum said to be over $723,000.

Campbell Soup Co., Camden, N. J., is building a new frozen soup plant and warehouse in Philadelphia.

Canada & Dominion Sugar Co., Ltd., is reported planning a $12 million refinery in Toronto to produce industrial liquid sugar.

Carnation Co. and **Western Condensing Co.** have organized a jointly-owned subsidiary to produce and market dry milk products.

Cherry-Burrell Corp. has announced completion of a purchase agreement with Sugar Creek Creamery to acquire remaining interest in Sugar Creek's "Gold'N Flow" process.

Chock Full O'Nuts Coffee Co. has taken a 21-year lease on a 20,000 sq. ft. structure in Brooklyn to be used for coffee roasting.

Christie, Brown and Co. has purchased a large tract where it expects to begin building a multi-million dollar baking plant.

Circle T Meats has formally opened a $200,000 meat processing plant in Dallas, featuring a quick-frozen, prepackaged line.

Citrus, Inc., new Haines City, Fla. firm, is constructing a $1,250,000 concentrate plant to handle a million boxes of fruit per season.

Cleveland Provision Co., Cleveland, Ohio, has sold its "Wiltshire", "Rose Premium", and other brand names and assets to Ohio Provision Co.

Clinton Foods, Inc.'s Snow Crop Div. reported it will spend $1,250,000 during the next few months on improvements at its frozen citrus concentrate plants in Dunedin, Frostproof and Auburndale, Fla.

Confectionery, Chocolate & Cocoa Industries of Canada has named Guy Lanctot, president, with Gordon Hamblin and Wayne Body as v.-p.s.

Dixie Lily Milling Co. is making plans to build Florida's first wheat flour mill to cost $1 to $1.5 million.

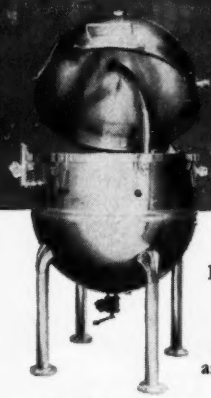
Dr. Pepper Co., has announced organization of a new dept. to plan long-range program of world distribution of its soft drink product.

Frito Co. of Dallas has elected Mary Livingston and John R. McCarty new directors.

General Foods Corp. has announced promotion of Dr. Henry B. Smith to technical director for engineering and commercial development, and Robert C. Reeves has been advanced from laboratory director to technical director of product and process development.

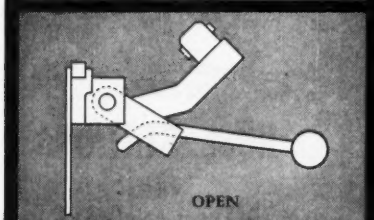
General Mills, Inc. of Minneapolis is constructing a $2.5 mil-

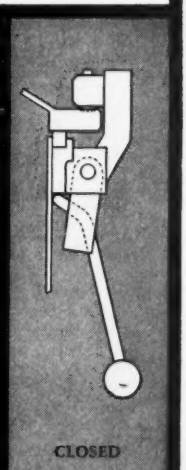
New flip-latches CUT COOKING TIME



Faster, one-motion FLIP-LATCHES on Hamilton Vacuum Kettles and Pressure Cookers cut costly load-discharge time in half. It's easy and fast to open and close the covers on Hamilton Kettles with Flip-Latches as compared to kettle cover fastenings employing wing nuts, lever-battens or nuts requiring wrenches.

For Vacuum or Pressure—the Hamilton "FLIP-LATCH" will insure a perfect seal. Should the gasket compress, just turn the stainless steel adjusting screw and secure with locking screw to the proper tension. Easy? Yes! And requires only a few minutes time. All steel construction except adjusting screw.





With Hamilton FLIP-LATCHES cutting your load-discharge time in half, figure your savings . . . either in terms of production time . . . cost per batch . . . man-hours . . . or net profit. No matter how you figure it the FLIP-LATCH feature will save you plenty.

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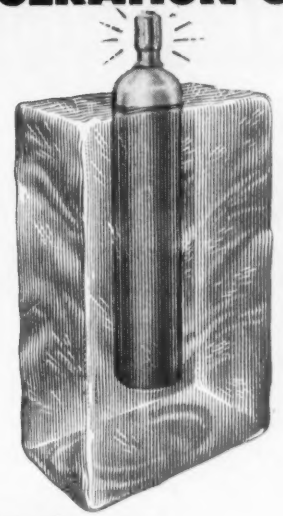

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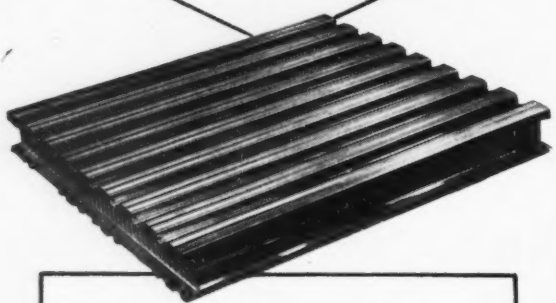

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Other vital features are LIGHTWEIGHT — yet strong enough to hold and stack the heaviest product — and SAFETY — presenting safer working conditions — no torn bags or damaged cartons from protruding nails, screws or splinters.

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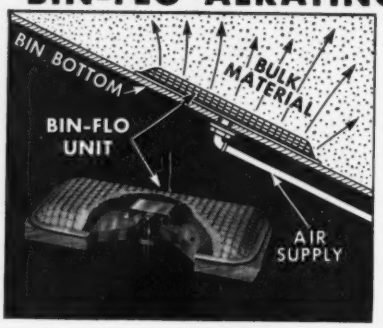

Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.

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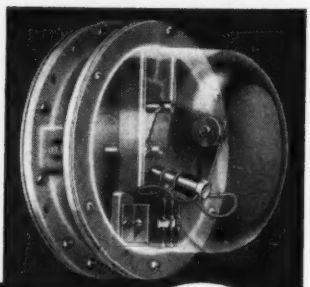
For All Bulk Materials

signals change in level; automatically starts and stops filling and emptying equipment.



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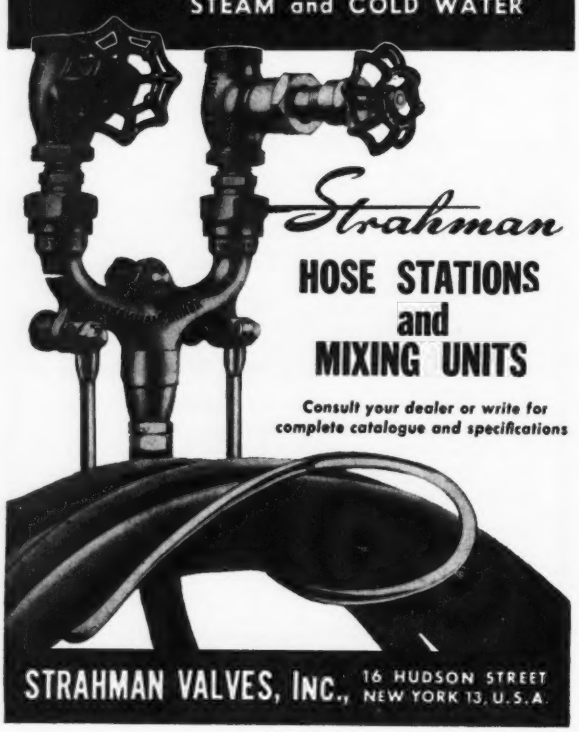

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Don W. McColly has been elected president of Wine Institute, trade association of Calif. wine growing industry. He succeeds Louis A. Petri.

lion plant at Etobicoke, Toronto suburb.

Interstate Bakeries Corp., Kansas City, purchased Butter Cream Baking Co. of Sacramento.

John Morrell & Co.'s new vice-presidents are J. M. Foster (sales), and R. T. Foster (company operations), and E. J. Grier.

Kansas City Chip Steak Co. has been organized with a pre-packaged frozen meat plant in K. C. to handle 20,000 tons of meat daily.

Libby, McNeill, & Libby is adding a $200,000 storage and freezing unit at its Sunnyvale, Calif. plant.

Master Brewers' Assn. of America has re-elected Harold Bosko, Bob Gadsby, George Reichl, and Bob Schmidt, as president, vice-president, treasurer and secretary respectively of District of New York.

Metropolitan Bottling Co., Pepsi subsidiary, has constructed a new plant at Milwaukee to triple productive capacity.

O'Donnell Usen Fisheries, Boston, has picked Gloucester, Mass. as the location for a new fish stick plant.

Olympia Brewing Co. has ordered plans for $1.2 million addition to its Tumwater, Wash. facilities.

Pet Milk Products Co. has purchased a five-acre tract in Augusta, Ga. for construction of a $2 million milk processing plant.

Redfern Sausage Co. has opened its new $350,000 plant in Atlanta, Ga.

Stokely-Van Camp Inc., Indianapolis, has acquired controlling interest in Pictsweet Foods, Inc. Mount Vernon, Wash.

Tea Council of Canada has been formed.

Tom Black, Inc., Knoxville, Tenn. food firm, is planning to construct a potato chip factory on recently purchased $75,000 property.

Personnel

A. C. Benjamin, executive vice-president and general manager of "Junket" Brand Foods, has been elected chairman of the Employee Relations Committee of Grocery Manufacturers of America, Inc.

George H. Blake has joined the Associated Products Div. of General Foods as product manager of Calumet Baking powder.

William A. Bowen of John G. Paton Co., Inc., New York City, was elected president of the Eastern Frosted Foods Assn., Inc.

J. Dudley Calhoun, vice-president of Arnold Bakers, Inc., has been named to the board of directors.

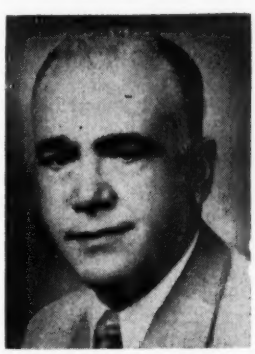
Lawrence L. Crane has been appointed vice-president of Colonial Sugars Co., New York City.

Sherman K. Ellis, Jr., is new product manager for Maxwell House regular coffees.

Albert W. Greenfield, Jr. was named a director of Loft Candy Corp.

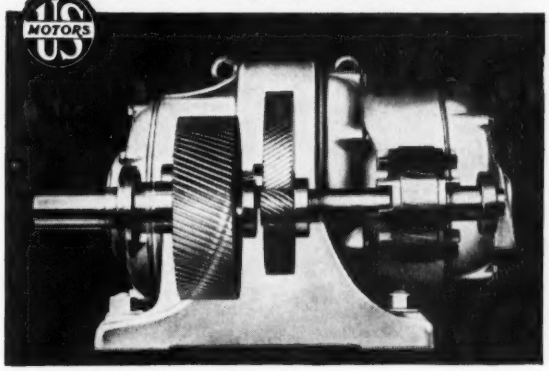
W. H. Jennings of Charlotte (S. C.) Bread Co. was elected president of Carolinas Bakers Assn. at its annual meeting.

Dr. Jane Leichsenring, prof. of nutrition at Uni. of Minne-



Peter La Rosa, president of V. La Rosa & Sons, Inc., Brooklyn firm which is one of leading producers of macaroni, was recently elected president of National Macaroni Manufacturers Assn.

Geared Power
SIMPLIFIED WITH
SYNCROGEAR



The motor that internally gears its speed

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Donald G. Ruff, formerly senior technical staff member of J. E. Siebel Sons, Co., Inc., Chicago chemical and engineering firm, has been appointed superintendent of production of Blatz Brewing Co.

sota, is winner of Borden Award for Fundamental Research in field of nutrition and experimental foods for 1954.

Joseph Marino was upped to post of vice-president of Sweet Life Food Corp.

Dr. W. McK. Martin, formerly with Dole Engineering Co., is now director of research for containers and packaging with Rheem Mfg. Co.

T. R. St. John was elected vice-president and general manager of all beef operations for Armour & Co.

W. P. Wilder was elected a director of Canadian Food Products Ltd.

Harry E. Wilson has been appointed regional manager for General Foods activities in South America.

Paul J. Zeman has been named vice-president of Washington Chocolate Co., Seattle.

Associated Industries

American Can Co. is undertaking major expansion of its shipping and warehouse facilities in St. Louis.

American Management Assn. elected the following new vice-presidents: Personnel Div., **Frederick G. Atkinson,** vice-president for R. H. Macy & Co.; Packaging Div., W. L. Romney, technical director of packaging, Proctor & Gamble Co.; Office Management Div., Herman Knauss, planning director, Mutual Life Insurance Co. of N. Y.; Finance Div., G. G. Hoit, executive vice-president, Stromberg-Carlson Co., Rochester, N. Y.

E. L. Bivans, Inc., Los Angeles manufacturers of automatic packaging machinery, has increased production facilities 130% with construction of a factory addition.

Conoflow Corp.'s new director of engineering and research is Warren H. Brand.

Continental Can Co. has broken ground in Chicago for a new research and development center for the Metal Div.

Crown Can Div. of Crown Cork & Seal Co., Inc., is building its new $4.5 million lithography plant in N. Philadelphia.

Dewey & Almy Co.'s Cryovac Div. has appointed Robert D. Lowry as technical director.

Du Pont & Co., Inc.'s "Kinetic" Chemicals Div. has announced plans for construction of new plant in Louisville, Ky., for manufacture of "Freon-22".

Guardian Paper Co. has been authorized with capitalization of $780,000 to manufacture polyethylene film and packaging materials.

Longview Fiber Co. will build a $1 million corrugated-box factory in Seattle.

Sealright Pacific Ltd., suppliers of sanitary paper containers and closures for Pacific Coast states, is building a new factory and headquarters in E. Los Angeles, Calif.

Union Bag & Paper Corp. has sold its Hudson Falls, N. Y. plant to Arkell & Smiths, and purchased a minority common stock interest in Hankins Container Corp., Cleveland paper container manufacturer.

Union Carbide & Carbon Corp.'s new director of research is Dr. Augustus B. Kinzel.

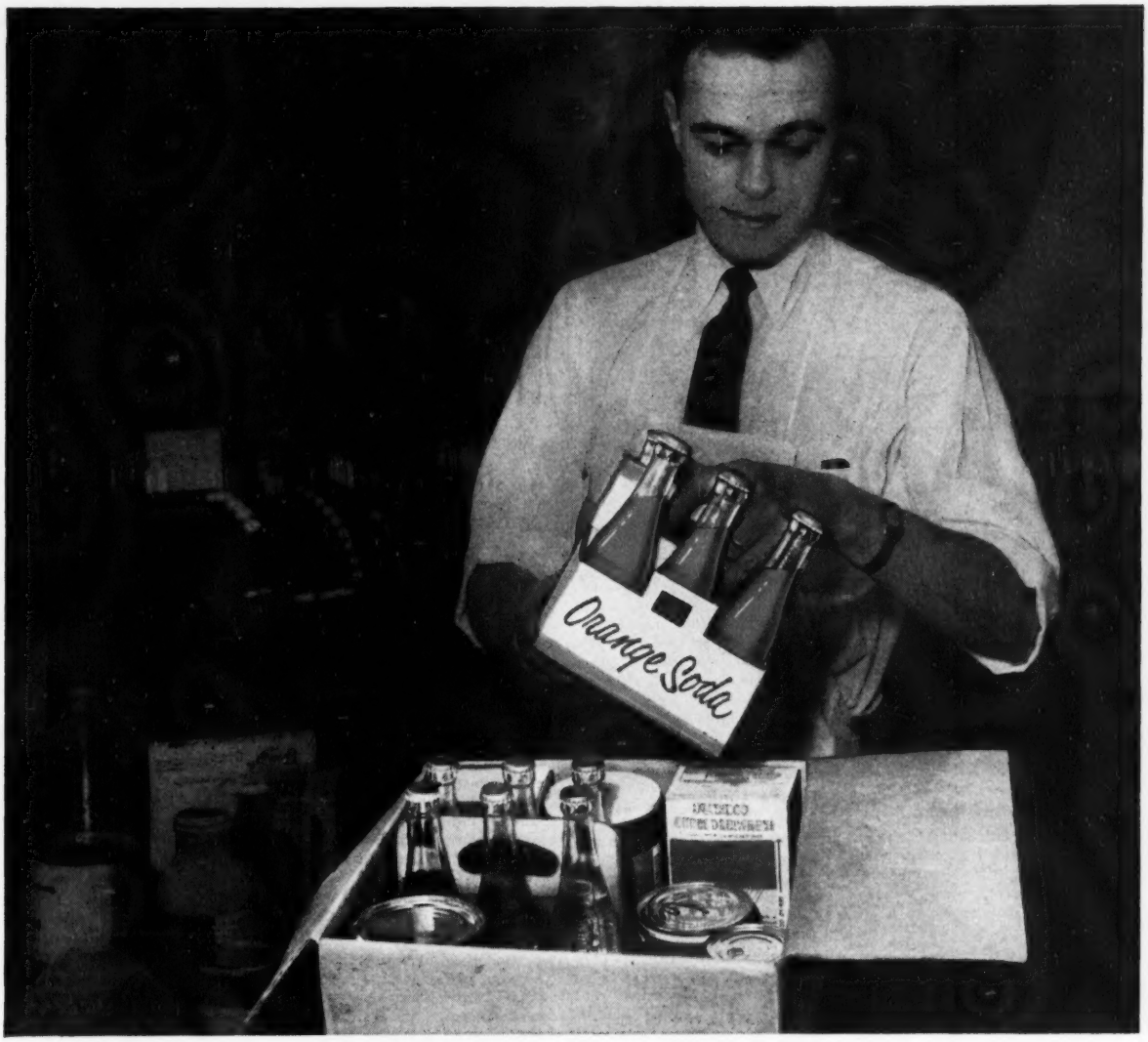
Deaths

Benjamin Anixter, 71, retired vice-president of Borden's Dairy Delivery Co., San Francisco.—July 1.

L. L. Rogers, 84, president of Rogers Canning Co., Milton, Ore.—July 4.

Correction

American Machine & Foundry Co. has not changed its corporate name to ACF Industries, Inc., as reported here last month. It retains its present name in its new headquarters at 261 Madison Ave., New York City. The change of name should have referred to **American Car & Foundry Co.**



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Food Plant Equipment

Pneumatic Equipment

Line of air pumps, compressors, drills and tools. Bulletin GP-100. —*Gardner-Denver Co., Quincy, Ill. (208A)*

Case Sealer

Information on case sealing machine with reported new glueing device. Leaflet.—*National Equipment Corp., 153-157 Crosby St., New York City 12. (208B)*

Chain Sprockets

Line of stock roller chain sprockets, with prices and sizes. Catalog C56-54. 8 p.—*Morse Chain Co., 7601 Central Ave., Detroit 10. (208C)*

Solenoid Valves

Design and performance characteristics of line of diaphragm operated solenoid valves. Bulletin M-500. 4 p.—*Eclipse Fuel Engineering Co., 1012 Buchanan St., Rockford, Ill. (208D)*

Porcelain Equipment

Uses and installation features of line of chemical porcelain equipment for process applications. Bulletin 438. 24 p.—*Lapp Insulator Co., Inc., LeRoy, N. Y. (208E)*

Rubber-Lined Pumps

Characteristics of rubber-lined centrifugal pumps. Form 300 RP-454.—*Industrial Filter & Pump Mfg. Co., 5900 Ogden Ave., Chicago 50. (208F)*

Granulating Unit

Features of all-steel granulators in a range of 4 sizes. 4 p. illustrated folder.—*Alsteele Engineering Works, Inc., Framingham, Mass. (208G)*

Steel Sprockets

Technical data and prices on extended line of steel taper-lock sprockets, roller chains and roller chain pin extractors. Bulletin A-632. 4 p.—*Dodge Mfg. Corp., Mishawaka, Ind. (208H)*

Centrifugal Pump

Description of centrifugal pump and how it works in progressive picture presentation. Form 7123. 16 p.—*Ingersoll-Rand, 11 Broadway, New York City 4. (208I)*

Air Control Equipment

Illustrated description of air regulators, filters, lubricators, drain traps and dehumidifiers. Bulletin 75. 10 p.—*Perfecting Service Co., 332 Atando Ave., Charlotte 6, N. C. (208J)*

Boiler Controls Apparatus

Information on boiler feeders, low water cut-offs, pump controllers and float operated valves and switches with capacity curves and roughing-in diagrams. Catalog SC-5. 24 p.—*McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18. (208K)*

Metering Pumps

Description of line of enclosed in-line, direct acting metering and proportioning pumps with built-in pressure relief valves and adjustment. Bulletin KP-54. 6 p.—*Hills-McCanna Co., 3025 N. Western Ave., Chicago 18. (208L)*

Oil Burner

Recently developed oil burner featuring compactness and simplicity of design, adjustable for burning fuel oil from #1-5 fuel oils. Bulletin AD-131.—*Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12. (208M)*

Torque Limiter

Description of adjustable slip-clutch devices that provide automatic overload protection for machinery drives, with illustrations of specialized adaptations. Catalog C-14-54. 8 p.—*Morse Chain Co., 7601 Central Ave., Detroit 10. (208N)*

Cooler-Dryer Machine

Revolving, horizontal drum for drying or dry-cooling with information on principles of heat transfer and heat, temperature and dust control. Book 2511. 20 p.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1. (208O)*

Single-Unit Pump

Design features and specification data on single-unit centrifugal pump. Bulletin 1001B. 4 p.—*De Laval Steam Turbine Co., Trenton 2. (208P)*

Replacement Valve Bodies

Information on line of replacement pinch valve bodies in rubber, neoprene, butyl, etc. Bulletin 345.—*General Rubber Corp., Tenafly, N. J. (208Q)*

Blow-Off Valves

Types of seatless and hard-seat blow-off valves. 2 p. folder.—*Yarnall-Waring Co., 100 Mermaid Ave., Philadelphia 18. (208R)*

Alloy Castings

Information on typical heat resistant and corrosion resistant alloy combinations with their applications, limitations and types of service for which suitable. Bulletin 141. 48 p.—*International Nickel Co., Inc., 67 Wall St., New York City 5. (208S)*

Drive Belts

Space-saving drive belts designed to combine strength and simplicity of flat belts with the speed and grip of V-belts. 8 p. folder.—*Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J. (208T)*

Disposal Screens

Description of rotary self-cleaning gravity type screening unit for canning industry. 6 p. folder.—*Green Bay Foundry and Machine Co., Green Bay, Wis. (208U)*

Air Compressors

Construction and operation information on several models of heavy-duty air compressors. Bulletin A-72. 36 p.—*Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22. (208V)*

Clutch-Coupling Unit

Dimensional data, service factors, and engineering data on clutch-coupling units. 4 p. brochure.—*Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich. (208W)*

Steam Traps

Information on combination float and thermostatic traps with photos, illustrations, sepcifications and capacities and installation pointers. 36 p. catalog.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2. (208X)*

Feeder Pumps

Models of pump for forcing liquids, solutions or gases through tubing with information on accessory tubing. 8 p. catalog.—*Sigamotor, Inc., 3 North Main St., Middleport, N. Y. (208Y)*

Bread Slicer

Features and specifications of production slicer with speed up to 40 loaves per min., capable of synchronization with any modern feed wrapper. Bulletin DM-1209. 6 p.—*American Machine & Foundry Co., Bakery Div., 261 Madison Ave., New York City 16. (208Z)*

Stapling Units

Machines for simultaneous closing of both ends of full overlap and telescope cartons. Bulletin P-401. 8 p.—*International Staple & Machine Co., 801 Herrin St., Herrin, Ill. (208AA)*

Liquid Pumps

Comprehensive information on end suction centrifugal pumps for liquid handling, including performance tables and curve diagrams. Bulletin 4011. 12 p.—*Deming Co., Salem, Ohio. (208AB)*

Gluing Equipment

Descriptions and illustrations of machines for hot or cold glueing and gumming with various attachments. Bulletin Nr. 6023. 6 p.—*Alfred Hofmann & Co., 635 59th St., West N. Y., N. J. (208AC)*

Enclosed Motors

Features of totally-enclosed explosion-proof motor for locations where dangerous gases are present, also dust-proof motor to guard against grain dust. Brochure.—*Lima Electric Motor Co., 50 Findlay Rd., Lima, Ohio. (208AD)*

Power Drives

Picture presentation of actual applications of electric power drives. 8 p. application tabloid bulletin.—*Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22. (208AE)*

Gear Units

Descriptions and illustration of standardized right angle bevel gear units with principle of localized bearing. Form ANG-54. 4 p.—*Airborne Accessories Corp., 1414 Chestnut Ave., Hillside 5, N. J. (208AF)*

Indirect Heating

Data on blast coil system of indirect heating, including tables of heater capacities, performance curves, physical data, etc. Bulletin CH-532. 24 p.—*Bayley Blower Co., 6610 S. 66th St., Milwaukee 14, Wis. (208AG)*

Speed Variators

Information on line of packaged speed variator drives from 1 to 200 horsepower. Catalog GEA-6127. 20 p.—*General Electric Co., Schenectady 5. (208AH)*

Industrial Propellers

Illustration of typical unit-installations of blade equipment for aerating, agitating, mixing and pumping. Folder. — *Columbian Bronze Corp., Freeport, L. I. (208AI)*

Infrared Heaters

Illustrated applications of operations of electric radiant heaters which provide more than 100 watts per sq. in. of lamp surface. 4 p. bulletin.—*N. J. Thermex Co., Inc., 535 Bergen St., Harrison, N. J. (208AJ)*

Gate Valves

Illustrated presentation of several types of steel gate valves, with dimension and specification tables. Bulletin 202B. 12 p.—*Manning, Maxwell & Moore, Inc., Watertown, Mass. (208AK)*

Packaging Machine

Information on model for controlled atmosphere packaging of food products. 6 p. illustrated brochure. — *Standard Packaging Corp., 629 Grove St., Jersey City 2. (208AL)*

Printing Packager

Unit that packs, prints and

counts automatically. 4 p. illustrated folder.—*Packmasters, 1056 Home Ave., Akron 10. (208AM)*

Steam Controls

Features of steam and liquid control equipment, including reference and specification tables, illustration and diagrams. Catalog 54. 56 p.—*O. C. Keckley Co., 400 W. Madison St., Chicago 6. (209A)*

Automatic Wrapper

Models of continuous, automatic feed wrapping machine for regular or irregular shapes. 4 p. illustrated folder.—*Hudson-Sharp Machine Co., Green Bay, Wis. (209B)*

Steel Heads

Information on press formed and spun stainless steel heads with list of typical uses and prices. 4 section folder.—*G. O. Carlson, Inc., Thorndale, Pa. (209C)*

Packaged Burners

Ratings, dimensions and data on forced draft packaged burners built to specifications. Unit Y. 6 p.—*Ray Burner Co., 1301 San Jose Ave., San Fran. 12. (209D)*

Drum Filler

Operation and performance details of automatic drum filler. Bulletin 54-475.—*Rucker Co., 4228 Hollis St., Oakland 8, Calif. (209E)*

Materials Handling

Power Conveyors

Illustrated description of three individual belted power conveyor frame designs with cutaway views of details. Bulletin 5.0-454. 24 p. *Food Machinery & Chem. Corp., Riverside, Calif. (209F)*

Handling Problems

How different companies in five different industries attacked and solved their handling problems, with illustrations. Catalog TC-80-554-115M. 20 p.—*Clark Equipment Co., Battle Creek, Mich. (209G)*

Ice Cream Trailers

Features of line of aluminum or steel refrigerated bodies for ice cream delivery. 6 p. folder.—*Herman Body Co., 4400 Clayton Blvd., St. Louis 10. (209H)*

Power-Lift Units

Illustrated specifications and data on electro-hydraulic platform and straddle stackers. Circular 28A. 4 p.—*Lewis-Shepard Products, Inc., Dept. R-48, Watertown, Mass. (209I)*

Push-Type Cranes

Light and heavy duty push-type cranes with illustrations and dimension tables. Bulletin PT-1253. 8 p.—*Industrial Crane & Hoist Corp., Chicago. (209J)*

Fork Truck

Features of fork truck built for rugged outdoor-indoor service. Folder B70-75M.—*Baker-Raulang Co., 1250 W. 80th St., Cleveland 2. (209K)*

Gasoline Tractor

Performance features of standard and heavy-duty models of four-wheel, gasoline tractor. Bulletins T-101 & T-102.—*Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9. (209L)*

Conveyor Belts

Information on light, flexible, acid-resistant conveyor belts. Catalog 2640. 4 p.—*B. F. Goodrich Co., Indus. Products Div., Akron, Ohio. (209M)*

Aluminum Truck Bodies

Comprehensive description of savings realized by over 30 companies operating aluminum truck bodies, with details on maintenance and repair. Form AD-399. 52 p.—*Aluminum Co. of Amer., Pittsburgh, 19. (209N)*

Stacking Information

Chart showing aisle width required for right-angle stacking with types of fork-trucks. "Space Wheel."—*Lewis-Shepard Products, Inc., Dept. R-49, Watertown, Mass. (209O)*

Control Equipment

Temperature Testers

Description and illustrations of portable potentiometer indicator and resistance thermometer used for periodic temperature tests to spot impending equipment trouble. Bulletin A-303. 8 p.—*Foxboro Co., Foxboro, Mass. (209P)*

Level Controller

System of time impulse transmission of liquid level and pressure with installation diagrams and illustrations. Bulletin 230-K10. 8 p.—*Builders-Providence, Inc., 345 Harris Ave., Providence 1, R. I. (209Q)*

Filter System

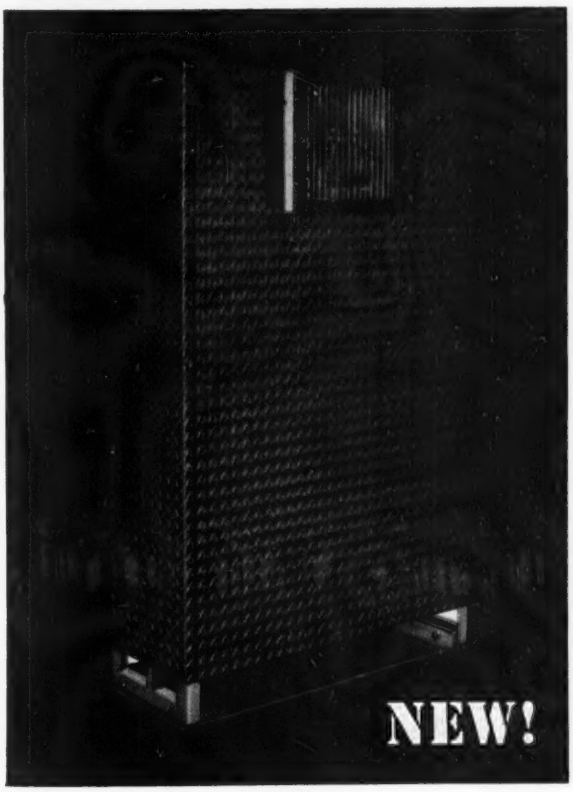
Combination unit for continuous settling and filter of relatively small solids. 4 p. illustrated brochure.—*Industrial Filtration Co., Lebanon, Ind. (209R)*

Excitation Unit

Features and specifications of models of excitation unit for precision spectrochemical analysis. Catalog V3-54. 8 p.—*Jarrell-Ash Co., Newtonville, Mass. (209S)*

Moisture Meter

Portable precision instrument for determining amount of surface



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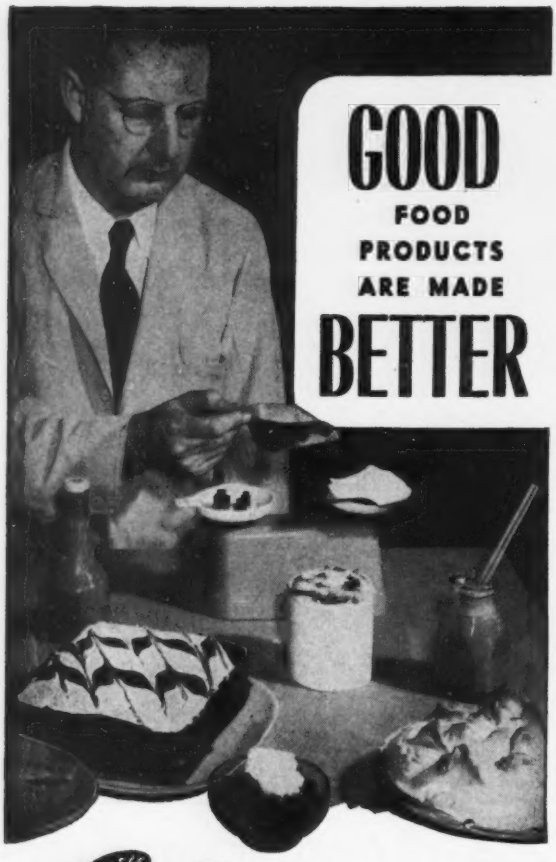

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material in powdered, granulated or fibrous materials. 4 p. bulletin. —*Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22. (209T)*

Thermocouple Wires

Sizes, accuracies, chemical compositions, weights and prices of thermocouple and extension wires. Specification sheet 307. 6 p.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44. (210A)*

Weighing Equipment

Features, application and operation of continuous weighing equipment for free flowing solid materials. Bulletin TA-1002-M. 8 p.—*Wallace & Tiernan Co., Inc., 25 Main St., Belleville 9, N. J. (210B)*

Flow Meter

Description of operating principle, capacities, pressures and materials of construction of meter, with close-up photos. Catalog 1027. 4 p.—*Penn Industrial Instrument Corp., 4110 Haverford Ave., Philadelphia 4. (210C)*

Recorder-Controllers

Technical data on multiple-point circular chart recorders. Bulletin F-452M. 4 p.—*Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. 4th St., Philadelphia 33. (210D)*

Switchgear Manual

Comprehensive illustrated presentation of the applications and operation of low voltage switchgear system. Bulletin 200. 36 p. —*Continental Electric Equipment Co., Box 1055, Cincinnati 1. (210E)*

Liquid Meter

Instrument for measuring industrial gas and liquids flows in wide range of applications with illustrations and capacity charts. Bulletin 190. 8 p.—*Brooks Rotameter Co., Lansdale, Pa. (210F)*

Filter Control

System of semi-automatic sequence operation for back-washing rapid sand water filters, through use of central control panels. Bulletin 480-L1. 4 p.—*Builders-Providence, Inc., 345 Harris Ave., Providence, R. I. (210G)*

Density Meter

Information on nuclear-electronic method of indicating any density range of liquids. 4 p. leaflets.—*Sierra Industrial Instrument Co., 371 Fourth St., San Francisco 7. (210H)*

Temperature Controls

Weathertight and explosion proof models for controlling temperatures up to 1000 deg. F. Bulletin 103.—*Burling Instrument Co., Inc., 16 River Rd., Chatham, N. J. (210I)*

Thermometer Bulbs

Description of resistance thermometer bulbs for temperature spans as narrow as 20 deg. F. and wet and dry assemblies for relative humidity measurement, with photos and drawings. Catalog 5701. 16 p.—*Minneapolis-Honeywell Reg. Co., Wayne & Windrim Aves., Philadelphia 44. (210J)*

Electrode Line

ph electrodes and electrodes for measuring redox potentials—assemblies, parts and accessories. Catalog EN-S5. 20 p.—*Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia 44. (210K)*

Moisture Determination

Summary of methods and list of equipment for determination of moisture. Pamphlet FM-2. 30 p.—*Central Scientific Co., 1700 Irving Park Rd., Chicago 13. (210L)*

Analytic Balance

Description and illustrations of two knife-edged, one-pan analytical balance with accessories. 8 p. bulletin.—*Fisher Scientific, 717 Forbes, Pittsburgh 19. (210M)*

Scale Indicator

Photos and features of vertical scale indicator designed for applications in narrow space. Bulletin 1541. 8 p.—*Minneapolis-Honeywell Reg. Co., Wayne & Windrim Aves., Philadelphia 44. (210N)*

Testing Sieves

Line of testing sieves, and sieve shakers for canned fruits and vegetables. Bulletin 4-54-5M. 6 p.—*Newark Wire Cloth Co., 351-365 Verona Ave., Newark 4. (210O)*

Plant Supplies

Palletizing Adhesives

Uses of types of adhesives for palletizing or unit loading shipping cases. Leaflet 5M-3-54.—*Swift & Co., Adhesive Products Dept., Chicago 9. (210P)*

Protective Coatings

Information on various maintenance protective coatings, including new primer item and white coating designed to resist solvents. 12 p. catalog.—*David E. Long Corp., 220 E. 42nd St., New York City 17. (210Q)*

Box Assortment

Line of molded, rigid plastic boxes. 20 p. booklet.—*Bradley Industries, 1650 N. Damen Ave., Chicago 47. (210R)*

Cellophane Uses

General properties of cellophane and information for specific appli-

cation in the food industry. Bulletin 3116. 8 p.—*Sylvania Div., American Viscose Corp., 1617 Pennsylvania Blvd., Philadelphia 3. (210S)*

Flavors Catalog

Listing of perfume bases and flavor materials with photos of research and control facilities. 24 p. catalog.—*Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., New York City 13. (211A)*

Industrial Thermometers

Pocket-size chart of F. and C. temperature indicator with red glass reading column.—*Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y. (211B)*

Insulating Tape

Illustrated characteristics, uses and application procedure of insulating mastic tape. Leaflet.—*Palladium Mastic Corp. of Amer., 327 Union Ave, Rutherford, N. J. (211C)*

Plastic Containers

Line of translucent and opaque plastic containers for food and other packaging uses, with photos and price list. Catalog.—*Plastic Container Corp., West Warren, Mass. (211D)*

Resin Coating

Unplasticized flexible coating available in colors, resistant to acids, alkalies and solvents with application data. Bulletin 400. 4 p.—*Carboline Co., Div., Mullins Non-Ferrous Castings Corp., 331 Thornton Ave., St. Louis 19. (211E)*

Insulating Material

Information on sizes of vermiculite, properties, uses and installation data, with photos and diagrams. Booklet 37-C-2. 8 p. and 16 p. bulletins.—*Vermiculite Institute, 208 S. La Salle St, Chicago 4. (211F)*

Pipe Repairs

Line of pipe repair clamps, service saddles, valve and bibb reseaters, etc. for leak repairs. Catalog 54. 30 p.—*M. B. Skinner Co., South Bend, Ind. (211G)*

Machinery Lubricants

Data on types of industrial lubricants and their specific uses. Booklet 54-1. 36 p.—*Lubriplate Div., Fiske Bros. Refining Co., 129 Lockwood St., Newark 5. (211H)*

Heavy-Duty Door

Rubber-covered, heavy-duty factory door designed to withstand wear of trucks passing through. Bulletin 52. 4 p.—*American Hard Rubber Co., 93 Worth St., New York City 13. (211I)*

Steam Cleaner

Unit for steam cleaning with cold water to 80 psi steam in 45 sec. with application photos. Catalog 1-54-2M. 4 p.—*Turbo Machine Co., Lansdale, Pa. (211J)*

Polyester Film

Information on properties and industrial applications of "Mylar" polyester film. Bulletin TR-1. 18 p.—*Film Dept., Du Pont Co., Wilmington 98, Del. (211K)*

Paper Boxes

Tips for buyers of folding paper boxes. 20 p. spiral-bound booklet. —*Edwin J. Schoettle Co., 533 N. 11th St., Philadelphia 23. (211L)*

Corn Sweeteners

Properties and uses of corn sugar, syrup and syrup solids in commercial mixes for ice cream, sherbets and ices. 20 p. booklet. —*Corn Industries Research Foundation, Inc., 3 E. 45th St., New York City. (211M)*

Service Coatings

Data on coatings for wide range of service conditions. Catalog C-150. 8 p.—*Ceilcote Co., 4832 Ridge Rd., Cleveland. (211N)*

Mastic Coatings

Composition and recommended applications of asphaltic mastic protective coatings.—*4 p. reprint of article, "Chemical Engineering," McGraw-Hill publication. (211O)*

Antioxidant Uses

Uses of antioxidant for fatty foods. Bulletin C-4-197. & C-4-115. 12 p.—*Koppers Co., Inc., Chemical Div., Pittsburgh 19. (211P)*

Sorbitol Uses

Characteristics and properties of sorbitol in confections and other foods, with recipes and procedures. Catalog CD-83-3M. 21 p.—*Food Indus. Div., Atlas Powder Co., Wilmington 99, Del. (211Q)*

Maintenance Paints

Recommendations for using heavy duty maintenance paints in milk plants. 15 p. booklet.—*Tropical Paint & Oil Co., Cleveland 2. (211R)*

Candy Conditioner

Description of product to prevent candy from becoming sticky in warm, humid weather. 4 p. folder.—*Henry H. Ottens Mfg. Co., Inc., 129-131 S. Front St., Philadelphia 6. (211S)*

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Miscellaneous

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Description and illustration of types of analytical chemical and engineering services available for consultation. 8 p. brochure.—*Foster D. Snell Inc., 29 W. 15th St., New York City. (212A)*

Valve Chart

Comparison of valve figure numbers of 16 major manufacturers of gate, globe, chec, and angle valves to aid in change-over problems. Form 194. 20 p.—*Ohio Injector Co., Wadsworth, Ohio. (212B)*

Bread Emulsifiers

Physical Chemistry and properties of various emulsifiers and action in dispersing fat in doughs. Folder.—*Hachmeister, Inc., Food Emulsifier Div., P. O. Box 357, Pittsburgh 30. (212C)*

Automation Information

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Ascorbic Acid Use

Chart to help meat packers in preparation and application of Vitamin C additions to cooked, cured and comminuted meats.—*Dept. AA, Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6. (212E)*

V-Belt Drive Films

Educational 35 mm. sound slidefilms for industrial maintenance men, plant engineers, etc.—*Allis-Chalmers Mfg. Co., General Machy. Div., Milwaukee 1. (212F)*

Stitcher Maintenance

Explanation and illustration of maintenance procedures for box stitching machines. Chart AD-154.—*Acme Steel Co., 2840 Archer Ave., Chicago 8. (212G)*

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Waste Treatment

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Varied uses and properties of recently developed polyester film. 20 p. booklet, No. 1.—*E. I. DuPont deNemours & Co., Inc., Product Information Service, Wilmington, Del. (212N)*

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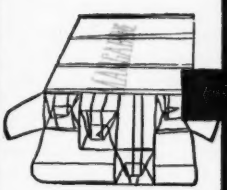

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(Continued from opposite page)

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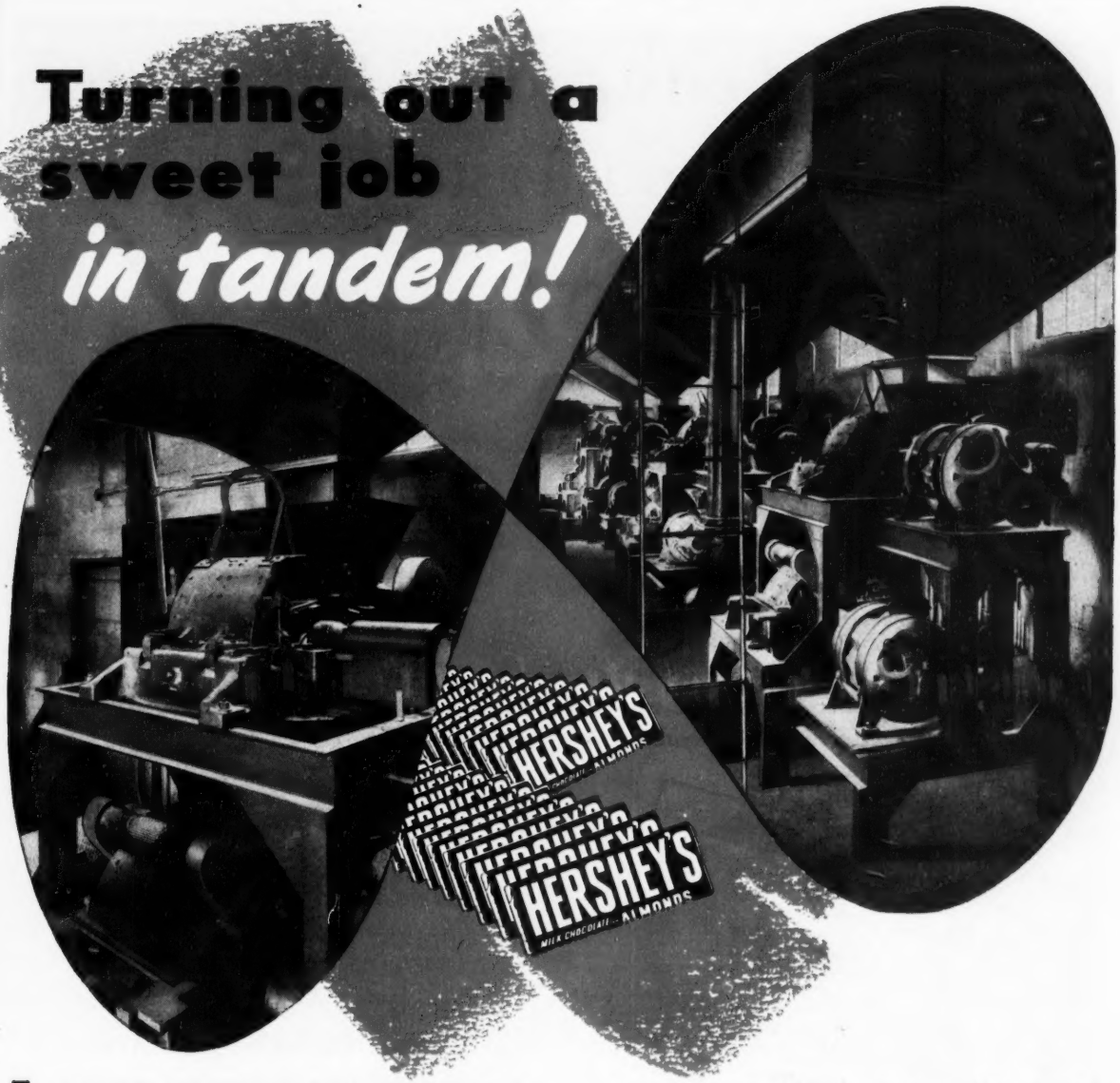

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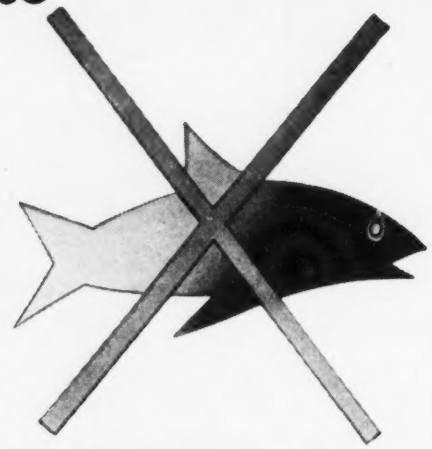

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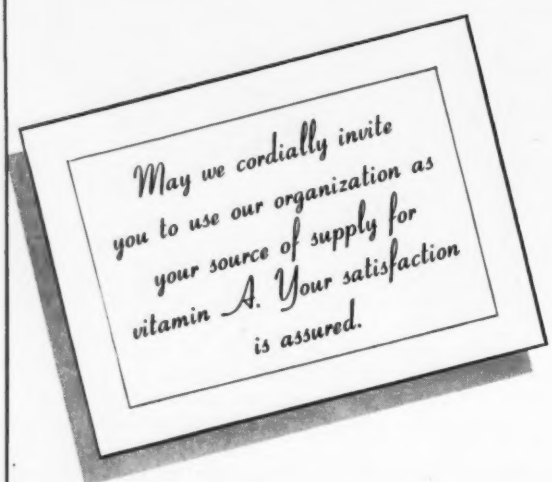

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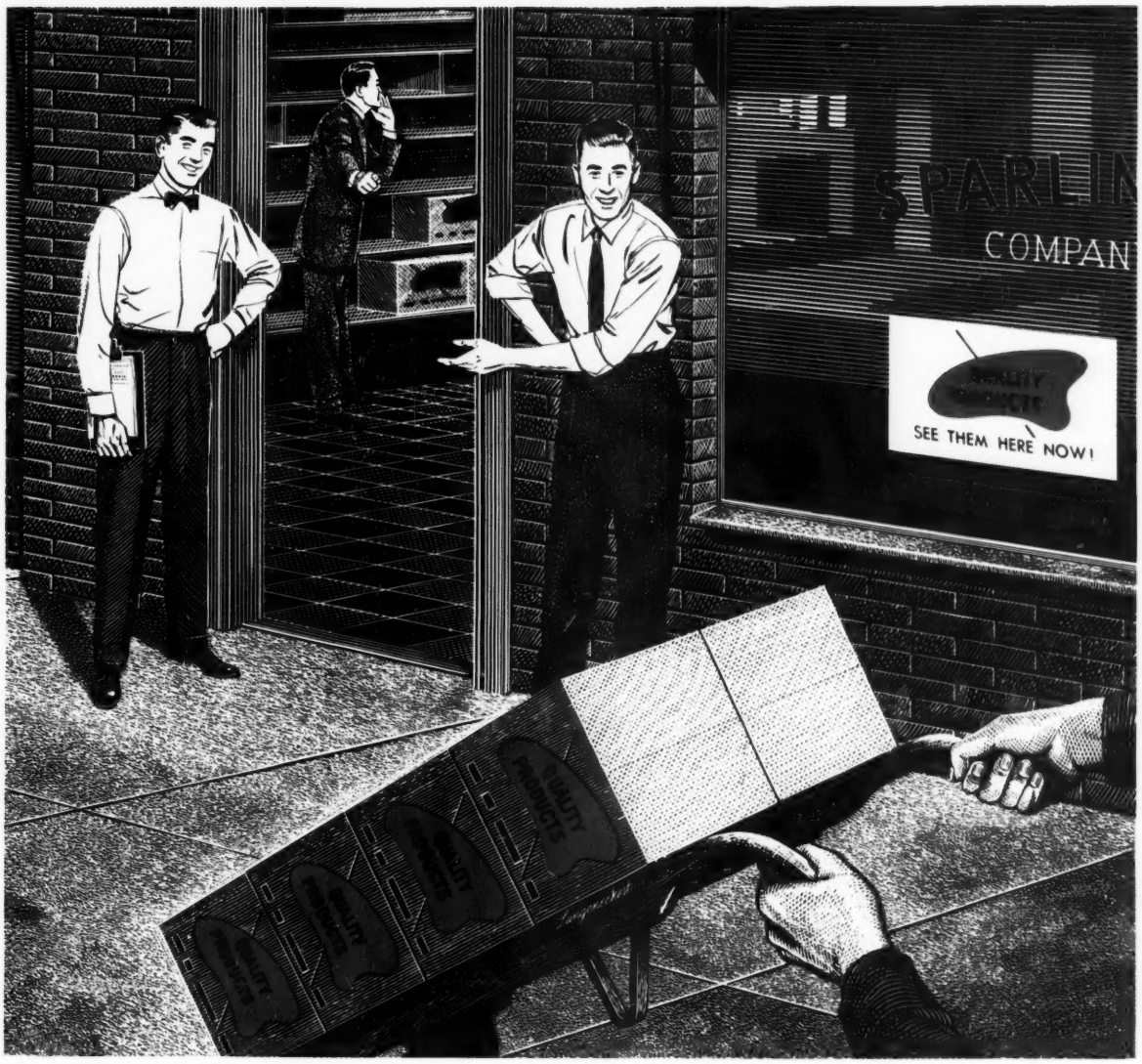

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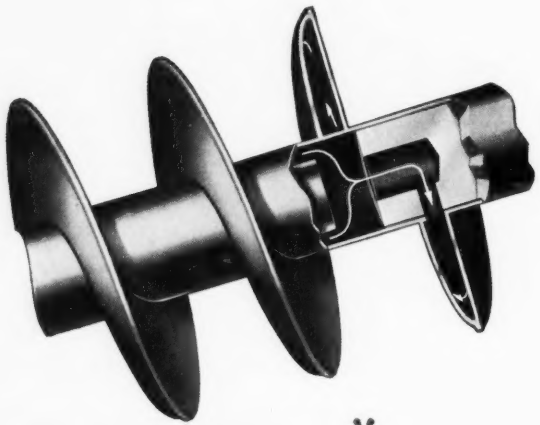

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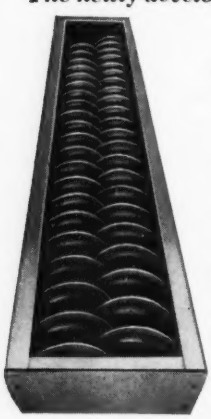

what IT IS!

Basically the HOLO-FLITE consists of two or more flights of hollow-bladed screw conveyors. The product to be processed moves in a trough around the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums—*as the product is continuously moved along in a bulk-flow without interruptions!*

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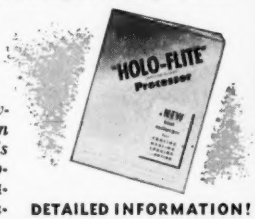

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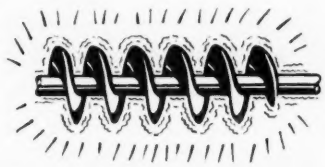

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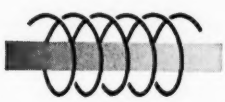

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